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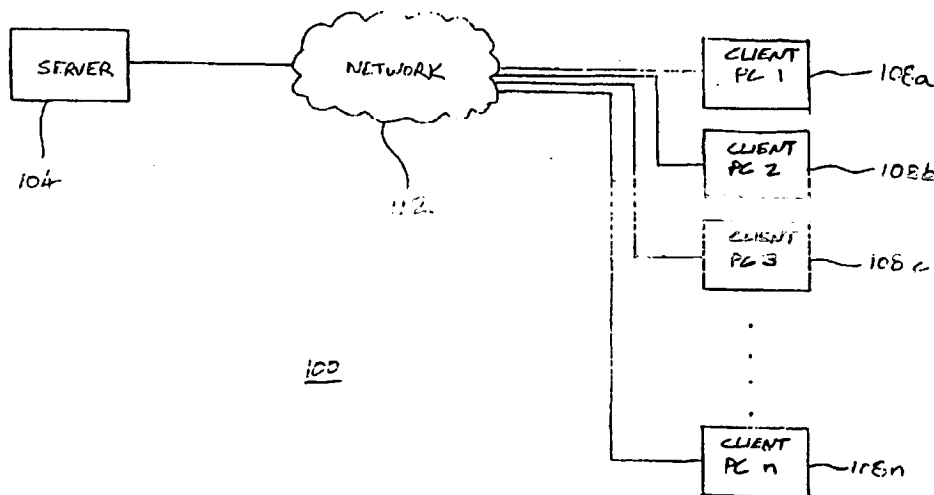
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(54) Title: ONLINE DIAGNOSING OF COMPUTER HARDWARE AND SOFTWARE



(57) Abstract: A method and apparatus for the online diagnosis and repair of computer hardware and software are provided. According to a method of the present invention, a client application and executable program scripts are downloaded to a computer to be diagnosed. The client application executes the scripts, and returns information obtained as a result of executing those scripts to a server. The server then applies a rules based analysis to the returned information, and provides a disposition to the computer to be diagnosed. The disposition may include information regarding a potential remedy for the detected problem or problems, or may include provisions to automatically effect a repair. According to one embodiment, the operation of the client application is coordinated with information communicated using a browser by polling a field provided in a database maintained at the server. According to a further embodiment, a client computer is directed to the exact universal resource location at which information or a file needed to effect a repair can be found.

WO 02/41105 A2

WO 02/41105 A2



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ONLINE DIAGNOSING OF COMPUTER HARDWARE AND SOFTWARE

FIELD OF THE INVENTION

The present invention relates to the diagnosing of computers from a remote location.

- 5 In particular, the present invention relates to a method and apparatus for diagnosing computer hardware, software and performance problems from a remote location, at least substantially without requiring human assistance at the remote location.

BACKGROUND OF THE INVENTION

- 10 The diagnosis and remediation of problems associated with the operation of computers is increasingly important to the computer industry. In particular, assisting both experienced and inexperienced computer users in remedying recurring problems has become a significant drain on computer hardware and software manufacturers. Typically, problems encountered by computer users are dealt with by human telephone operators. The telephone
- 15 operators, or "support personnel," may or may not have access via a communications link to the problem computer. Generally, the process of diagnosing and remedying computer problems from a remote location is time consuming for both the computer user and the support personnel. Furthermore, the provision of support personnel is a significant cost to the computer industry.

- 20 In order to reduce the expenses associated with maintaining a cadre of support personnel, the computer industry has implemented various approaches. For instance, some software and hardware companies severely limit user access to support personnel. Access may be limited to recent purchasers of a product, or the user may be charged a fee for contacting the support personnel. However, limiting the access of customers to assistance
- 25 by restricting those customers who are eligible for such assistance or by charging fees for such assistance generates ill will among customers. In addition, such approaches do not reduce the time required to successfully remedy problems and they do not reduce the difficulty of diagnosing and remedying problems from a remote location.

- As an alternative or in addition to restrictions on access to support personnel, some
- 30 computer hardware and software providers supply "online" help. Such online help may be in the form of statements of typical problems and suggested solutions to those problems. This online help may be stored in media provided with the hardware or software or may be accessible to the user by contacting a specified server over a computer network, such as the

Internet. However, such systems are ineffective if the computer user is unable to recognize his or her particular problem from among the included problems and suggested solutions. In addition, such systems provide assistance only with problems directly associated with a particular piece of hardware or software. Therefore, they are generally unable to assist a user in successfully addressing, for example, problems that affect the particular hardware or software but that are caused by another hardware or software component in the user's computer.

The providers of computer hardware and software have also utilized programs that allow support personnel at a remote location to operate or obtain information from a user's computer from the remote location. Such systems have the advantage of allowing trained personnel to directly address the user's computer. However, users may object to allowing a stranger to have complete access to the user's computer. In addition, such systems do not remove the need for maintaining support staff, and such systems have a relatively high impact on the resources of the user's computer.

Still another approach to providing support for computer users is to provide automated or semiautomated diagnostic programs. Such programs may be resident on the user's computer, or may be accessed over a computer network, such as the Internet. However, providing a support program resident on a user's computer having the ability to diagnose and potentially address a wide range of problems requires a relatively large program. Particularly where a user's computer is not operating properly, loading or accessing such a program can be problematic. Similarly, diagnostic programs that allow a user to interconnect to them over a computer network generally have a high impact on the user's computer, in that the programs are relatively large and require a relatively large amount of memory and resources to operate. For instance, Internet browsers may allow access to a computer's system information and control settings, however the browser components necessary to allow such interactivity, such as ACTIVE X or other browser "plug ins," demand a relatively large amount of resources on the user's computer. In addition, not every type or version of browser is compatible with a particular browser plug-in, and the user may be required to obtain and install additional or alternative browsers or plug-ins. Accordingly, the operation of such systems can be problematic. Furthermore, such systems are incapable of effecting automatic repairs to a user's computer.

It would be advantageous to provide a method and apparatus that enabled computer problems to be diagnosed and remedied from a remote location. In particular, it would be advantageous to provide a method and apparatus to remotely diagnose and remedy computer problems from a remote location that essentially did not require involvement by support personnel at the remote location. In addition, it would be advantageous to provide a method and apparatus for diagnosing computer problems from a remote location capable of operating on computers having limited resources available as a result of a problem or problems requiring diagnosis. It would also be advantageous to provide a method and apparatus that did not require a user to state the exact nature of the problem in order to obtain a suggested solution. Furthermore, it would be advantageous to provide a method and apparatus for diagnosing computer problems from a remote location capable of successfully diagnosing a majority of presented problems, and that could be provided at reasonable cost.

SUMMARY OF THE INVENTION

In accordance with the present invention, a method and apparatus for diagnosing computer problems from a remote location are provided. The present invention generally allows diagnostic tests or individual commands to be downloaded from a remote location and operated on a computer or other device to be diagnosed. In particular, the present invention allows for the diagnosis of a computer without requiring a large amount of the resources of the computer to be diagnosed. Furthermore, where an automated solution is available, the present invention is capable of repairing the computer.

In accordance with one embodiment of the present invention, method and apparatus are provided that allows for the remote diagnosis of computer problems. According to the method and apparatus, the user of a computer to be diagnosed initiates contact with a diagnosing server. This contact may be made over a computer network, including a wireless network, using a communications interface, such as an Internet browser program. A client application is then downloaded from the server to the computer. The client application is capable of executing scripts or individual commands that may be downloaded from the diagnosing server. In general, the scripts comprise diagnostic tools for collecting various information regarding the client computer. The results obtained from executing the client scripts or individual commands are returned to the diagnosing server. The returned results

are compared to stored results using a rules based analysis, and a disposition is returned to the browser of the computer. The disposition may include automatically performing a maintenance or repair procedure, may suggest that the user perform a particular maintenance or updating procedure, may automatically take the user to a web page or information source, 5 or may refer the user to a source of further information or assistance regarding the diagnosed problem.

In accordance with another embodiment of the present invention, a client application running on a computer to be diagnosed is provided with an identifier generated by the diagnosing server by passing the identifier from the title bar of the browser to the client 10 application.

According to still another embodiment of the present invention, the client application polls a server application running on a remotely located server. In particular, the client application polls the server for instructions concerning a next operation to be performed in connection with the computer. For instance, the client application may poll a server 15 application for an instruction to execute a script or command. After executing a script or command, the client application signals the server application that execution has been completed. An indication that execution of a particular script has been completed is entered in a database record associated with the client computer and identified by the identifier. In addition, the browser may poll the server application to detect an indication that execution 20 of the script has been completed. In response to detecting such an indication, the browser or screen displays a next page to the user.

According to yet another embodiment of the present invention, a user establishes contact with a remotely located server using an Internet browser or other communications interface. The user registers with the server and is assigned an identifier. A client 25 application is downloaded from the server and installed on the client computer or device. Next, a script or command, for execution using the client application, is downloaded to the client computer. The client application polls a record in a database maintained by the remotely located server and having the same identifier as the client computer to detect a signal to begin execution of the script or command. The indication to execute the script or 30 command may be provided in response to a signal from the browser or other communications interface authorizing such execution. Upon detection of the indication, the script is executed,

and the results are returned to the server. The browser or other communications interface polls the database record to detect an indication that execution of the script or command has been completed. Upon detecting such an indication, the browser or other communications interface displays a next page.

5 According to still another embodiment of the present invention, the user of the client computer is prompted to specify whether the problem is believed to be a hardware, software or performance problem. Based on the user's selection, additional scripts or commands may be downloaded to the client application and executed. For instance, if a user specifies a software problem, a script may be downloaded to the client application to determine the
10 nature of the problem. For instance, upon execution, such a script can instruct the user to start the problem application. The script may then determine the amount of time required for the computer to load the application, or may collect an error message generated in response to the user's attempt to start the problem application and return that error message to the server for analysis.

15 A variety of diagnostic tools in the form of scripts or commands may be downloaded to and executed by the client application. In general, the scripts or commands are provided to perform inventory and diagnostic functions. The client application and associated scripts or commands are designed to have a low impact on the system resources of the computer.

 Based on the foregoing summary, a number of salient features of the present
20 invention are readily discerned. A method and apparatus for diagnosing problems on a computer or other device from a remote location are provided. The method and apparatus of the present invention enable problems to be diagnosed and potential solutions proposed to a user of the computer or other device substantially without requiring human intervention at the server side. The present invention may also provide an automated solution to a
25 problem on a computer being diagnosed. In addition, the method and apparatus of the present invention have a low impact on the resources of the computer or other device being diagnosed, thereby increasing the probability that the method and apparatus will successfully diagnose problems even on computers or other devices having reduced system capabilities due to the problem or problems requiring diagnosis.

30 Additional advantages of the present invention will become readily apparent from the following discussion, particularly when taken together with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram depicting the major components of a system in accordance with an embodiment of the present invention;

Fig. 2 is a block diagram depicting a server in accordance with an embodiment of the present invention;

Fig. 3 is a block diagram depicting a client computer in accordance with an embodiment of the present invention;

Fig. 4 is a block diagram depicting the logical lines of communication between a server and a client computer in accordance with an embodiment of the present invention;

Fig. 5 is a flow chart illustrating the operation of a system in accordance with an embodiment of the present invention;

Fig. 6 is a diagram depicting the operation of a client application in accordance with an embodiment of the present invention;

Fig. 7 is a diagram depicting the operation of a communications interface in accordance with an embodiment of the present invention;

Fig. 8 is a flow chart depicting the operation of test modules in accordance with an embodiment of the present invention;

Fig. 9 is a flow chart depicting the operation of a system in accordance with an embodiment of the present invention in response to the selection of a hardware problem;

Fig. 10 is a flow chart depicting the operation of a system in accordance with an embodiment of the present invention in response to the selection of a software problem;

Fig. 11 is a flow chart depicting the operation of a system in accordance with an embodiment of the present invention in response to the selection of a performance problem;

Fig. 12 is a flow chart depicting the operation of a system in accordance with an embodiment of the present invention in response to the selection of an unknown problem;

Fig. 13 is a flow chart depicting the provision of a disposition to a client computer in accordance with an embodiment of the present invention;

Figs. 14A-14E illustrate categories and subcategories of self-help dispositions in accordance with embodiment of the present invention;

Fig. 15 is a flow chart depicting a disposition determining process in accordance with an embodiment of the present invention;

Fig. 16 is a screen shot of a diagnostic service welcome screen in accordance with an embodiment of the present invention;

Fig. 17 is a screen shot of disclaimer and security notification page in accordance with an embodiment of the present invention;

5 Fig. 18 is a screen shot of a minimum system requirements page in accordance with an embodiment of the present invention;

Fig. 19 is a screen shot of a log-in page in accordance with an embodiment of the present invention;

10 Figs. 20A and 20 B are screen shots of a subscription purchase page in accordance with an embodiment of the present invention;

Fig. 21 is a screen shot of a log-in name and password selection page in accordance with an embodiment of the present invention;

Fig. 22 is a screen shot of a functional test sequence welcome page in accordance with an embodiment of the present invention;

15 Fig. 23 is a screen shot of a test in progress page in accordance with an embodiment of the present invention;

Figs. 24A-C are screen shots of a system information report in accordance with an embodiment of the present invention;

20 Fig. 25 is a screen shot of a problem selection page in accordance with an embodiment of the present invention;

Figs. 26A-26C are screen shots of a hardware problem selection page in accordance with an embodiment of the present invention;

Fig. 27 is a screen shot of a monitor problem solution page in accordance with an embodiment of the present invention;

25 Figs. 28A and 28B are screen shots of a bad or distorted picture solution page in accordance with an embodiment of the present invention;

Figs. 29A and 29B are screen shots of a video driver problem solution page in accordance with an embodiment of the present invention;

30 Figs. 30A and 30B are screen shots of a video connector problem solution page in accordance with an embodiment of the present invention;

Figs. 31A and 31B are screen shots of a video card connection problem solution page in accordance with an embodiment of the present invention;

Fig. 32 is a screen shot of a video card capability problem solution page in accordance with an embodiment of the present invention;

5 **Fig. 33** is a screen shot of a hard disk drive problem selection page in accordance with an embodiment of the present invention;

Figs. 34A and 34B are screen shots of a hard disk drive write problem solution page in accordance with an embodiment of the present invention;

10 **Fig. 35** is a screen shot of full hard disk drive problem solution page in accordance with an embodiment of the present invention;

Fig. 36 is a screen shot of a fragmented hard disk drive problem solution page in accordance with an embodiment of the present invention;

Figs. 37A and 37B are screen shots of a hard disk drive connector solution page in accordance with an embodiment of the present invention;

15 **Fig. 38** is a screen shot of a printer not detected solution page in accordance with an embodiment of the present invention;

Figs. 39A-39C are screen shots of a printer CMOS entry problem solution page in accordance with an embodiment of the present invention;

20 **Figs. 40A-40D** are screen shots of a printer connection problem solution page in accordance with an embodiment of the present invention;

Fig. 41 is a screen shot of a software problem selection page in accordance with an embodiment of the present invention;

Fig. 42 is a screen shot of a software error, scan disk disposition screen in accordance with an embodiment of the present invention;

25 **Fig. 43** is a screen shot of a scan disk information page in accordance with an embodiment of the present invention;

Fig. 44 is a screen shot of a software error defragmentation diagnostic page in accordance with an embodiment of the present invention;

30 **Fig. 45** is a screen shot of a defragmentation information page in accordance with an embodiment of the present invention;

Fig. 46 is a screen shot of a software error, check for error message disposition page in accordance with an embodiment of the present invention;

Fig. 47 is a screen shot of a check program error information page in accordance with an embodiment of the present invention;

5 Fig. 48 is a screen shot of an error message found page in accordance with an embodiment of the present invention;

Fig. 49 is a screen shot of an uninstall program information page in accordance with an embodiment of the present invention;

10 Figs. 50A and 50B are screen shots of a problem status page in accordance with an embodiment of the present invention;

Figs. 51A and 51B are screen shots of a summary report page in accordance with an embodiment of the present invention;

Fig. 52 is a screen shot of a potential issues page in accordance with an embodiment of the present invention;

15 Fig. 53 is a screen shot of a maintenance issues page in accordance with an embodiment of the present invention; and

Fig. 54 is a screen shot of a service and upgrade options page in accordance with an embodiment of the present invention.

20 DETAILED DESCRIPTION

Fig. 1 illustrates a system 100 in accordance with an embodiment of the present invention. The system 100 generally includes a server 104 interconnected to a plurality of client computers 108a to 108n by a network 112. In general, the network 112 may be any computer network or means of establishing communications between two computers, 25 including the Internet and wireless methods.

With reference now to Fig. 2, a server 104 in accordance with an embodiment of the present invention is illustrated. The server 104 generally includes a processor 200, a network interface 204 and storage 208. The storage 208 may include a database 212 and stored programs 216. The stored programs 216 may include a client executable package 220 and 30 a server application program 224.

In general, the processor 200 may be any computer processor suitable for use in a general purpose server computer. For instance, the processor 200 may comprise one or more INTEL PENTIUM® class microprocessors. The network interface 204 may be any communications interface suitable for interconnecting a server computer to a communication network 112. For example, the network interface 204 may comprise a TCP/IP interface or others. The storage 208 may comprise any mass media storage device, such as a hard drive, tape drive, or optical drive. In addition, the storage 208 may comprise multiple devices of various types.

The database 212 may be any control program and associated records suitable for storing and organizing information. The client executable package 220 generally includes programs for downloading to client computers 108. The server application program 224 includes the commands and instructions required to coordinate the registration of users with the system 100, the downloading and execution of components of the client executable package 220, and the exchange of information between the database 212 and the client computers 108. Accordingly, the server application program 224 may include components to interface the database 212 to the client computers 108.

Fig. 3 depicts a client computer 108 in accordance with an embodiment of the present invention. The client computer 108 may comprise a central processing unit (CPU) 300, input/output devices 304 and peripheral devices 308. According to one embodiment of the present invention, the client computer 108 is any general or personal type computer. According to a further embodiment of the present invention, the client computer 108 is a PC computer running a MICROSOFT WINDOWS® operating system. As used herein, the term client computer may, in addition to a general or personal type computer, also refer to a variety of digital devices capable of communicating with another digital device, including personal digital assistants (PDA's) or other hand held devices.

According to one embodiment of the present invention, the CPU 300 generally includes a processor 312, storage 316, a network interface 320, a video card 324 and a plurality of internal devices 328. The internal devices may comprise memory 332, a hard disk drive 336, a floppy disk drive 340, a CD-ROM drive 344, a tape drive 348 and other internal devices 350. The input/output devices may include a video display or monitor 352, a keyboard 356, a mouse 360 and other input/output devices 364 such as audio devices and

additional pointing devices. The peripheral devices 308 may generally include a printer 368, a scanner 372 and other external devices 376. The client computer 108 may also include operating software 380 and application software 384. In general, the various components of the client computer communicate with one another over a communications bus 388.

5 With reference now to Fig. 4, the logical lines of communication between the server 104 and the client computer 108 are illustrated. In general, a first logical line of communication 408 extends between the server application 224 and a communications interface 404. The communications interface 404 may include any communications application running on the client computer or device 108 that is capable of passing data
10 between the client computer or device 108 and the server application program 224. For example, the communications interface may comprise an Internet browser. Similarly, a second logical line of communication 412 extends between the server application 224 and the client application 400. A third logical line of communication 416 extends between the client executable package 220 and the client application 400. As is evident from Fig. 4,
15 except for an identifier communication path 418, there is generally no direct line of communication between the client application 400 and the communications interface 404. Accordingly, with the exception of passing an identifier from the communications interface 404 to the client application 400 over the identifier communication path 418, as will be described below, the client application 400 and the communications interface 404
20 communicate via the server application 224. The physical communications link over which the logical communication channels 408, 412 and 416 are established may comprise the computer network 112 and associated network interfaces 204 and 320 described above. The physical communications link over which the identifier communication path 418 is established may comprise the communications bus 388 or internal registers.

25 The operation of the client application 400 and the communications interface 404 are synchronized to each other by monitoring a field in tables or records 420 stored in the database 212 through an interface provided by the server application 224, as will be explained in detail below. This arrangement allows the client application 400 to be implemented as a relatively small program that requires relatively few of the client
30 computer's 108 system resources to operate. In particular, it allows the client application 400 to control aspects of the operation of the client computer 108 without requiring a program

that is integrated with the communications interface 404. More particularly, the client application 400 is selectively provided with diagnostic tools, such as individual commands or application scripts 424 that perform selected functions. For example, the diagnostic tools may comprise code that is capable of execution while residing on the client computer 108.

- 5 This is advantageous, as programs integrated with a communications interface 404, such as an Internet browser, that are capable of detailed interaction with the operational aspects of the client computer 108 typically consume a relatively large amount of system resources. In addition, such programs may not be compatible with all versions or types of a communications interface 404. Accordingly, the arrangement illustrated in Fig. 4 enables
- 10 the present invention to function even on client computers 108 having compromised performance characteristics, for example due to a problem requiring diagnosis. The arrangement illustrated in Fig. 4 also allows the present invention to operate in cooperation with a wide range of communications interfaces 404.

- With reference now to Fig. 5, the operation of a system 100 in accordance with an
- 15 embodiment of the present invention is illustrated. Initially, the user of a client computer or device 108 establishes a connection with the server 104 (step 500). The user may establish the connection by, for example, directing a communications interface 404 on the client computer 108 to a website providing access to the server 104 over a computer network 112. According to one embodiment of the present invention, active server pages may be used to
- 20 provide the user of the client computer or device 108 with information from the server application 224. Information from the user may be provided to the server application 224 using the communications interface 404.

- As part of establishing a connection with the server 104, the user may be required to register with the server 104. Registration may include the provision of information
- 25 identifying the user to the server 104. In particular, registration may include the creation of a record 420 in the database 212 for recording various information collected from the user. For instance, the record 420 for user information may include fields for a user name, a user address, and billing information, such as a credit card number and expiration date. Furthermore, the record 420 for user information may include a field for storing an identifier
- 30 assigned by the server application program 224 and used by the system 100 to distinguish a particular client computer 108 from any other client computers 108 that are or have been in

communication with the server 104. The identifier also allows an individual user to register and diagnose more than one client computer 108. A field for indicating a next script or command and a next page of information to display may also be provided. In addition, a script status field may be provided and used to synchronize the operation of the client application 400 and the communications interface 404.

Following the completion of registration, the client application 400 is downloaded to and installed in the client computer 108 (step 504). A first command, script or set of scripts 424 may be downloaded with the client application 400. As used herein, the term script 424 should be understood to include a command or set of commands capable of being executed by the client application program 400. The command or commands comprising a script 424 may define a diagnostic tool that is useful in triggering execution of a program code that is already resident in the client computer 108. In general, the client application program 400 receives scripts 424 from the server 104 and executes those scripts 424. According to one embodiment of the present invention, a number of scripts 424 are provided. The use of a number of relatively small scripts 424 minimizes the impact that running the scripts 424 using the client application 400 has on the client computer 108. In addition, the use of multiple scripts 424 allows the diagnosis of the client computer 108 to progress at a steady pace, rather than requiring a relatively long initial wait to download program code before testing can begin. Furthermore, the use of multiple scripts 424 allows the download and performance of only those tests that may be useful in diagnosing a particular client computer 108, thereby providing an efficient test process.

The scripts 424 may be grouped as one or more test modules or diagnostic tools that perform various functions. The diagnostic tools may themselves comprise one or more scripts 424, or they may comprise tools already resident in the client computer that are launched by a script 424. In general, each of the scripts 424 performs a discrete operation or set of operations when executed by the client application 400, as will be explained in the discussion set forth below.

At step 508, the various tests are performed on the client computer 108. According to one embodiment of the present invention the various test modules and other program components are executed immediately or almost immediately after they are downloaded to the client computer 108. Therefore, according to this embodiment of the present invention,

the step of downloading program components (step 504) may alternate with the step of executing the test modules or commands. The results obtained from executing the test modules and any other program components are then returned from the client application 400 to the server application 224 over logical line of communication 412. The return of collected
5 information to the server application 224 may also be carried out following the execution of each test module or individual test script 424.

According to one embodiment of the present invention, general tests may be performed, and additional tests may be performed after responses to questions presented to the user have been elicited. Accordingly, the present invention may provide an interactive
10 problem solving method.

The server application 224 stores the returned results in a record or records 420 maintained on the database 212. According to one embodiment of the present invention, a record 420 is provided for each major category of information relating to the client computer 108. For example, the records 420 may include individual records for information
15 concerning the user, monitor, ports, printers, storage devices, system settings, video adaptor, performance, software, audio devices, component manufacturers and disposition. Additional or fewer types of records may be used. In general, the records 420 containing information concerning a particular client computer or device 108 are identified by the identifier assigned to that client computer 108 by the server application 224 when the user registered with the
20 server application 224. In addition, the records 420 may include records containing general information concerning particular problems and associated dispositions, including scripts 424 to perform procedures, including repair procedures, information regarding potential fixes, and contact information for automated transport to sources of additional support regarding particular devices or problems. Where automated transport is provided, the communications
25 interface 404 may be automatically directed to a Web page, such as a Web page maintained by the manufacturer of a problematic device or program, that contains relevant information. The database 212 may also store the scripts 424 to perform maintenance procedures and software patches, or links to such scripts 424 and software patches.

At step 512, a rules-based determination of the disposition of the client computer 108
30 is conducted. In general, information obtained from the execution of the test modules or commands and other software components is analyzed, and a disposition concerning the

client computer 108 is arrived at. The rules-based analysis is, according to one embodiment of the invention, adaptive in that the disposition returned to a client computer 108 in response to a particular problem may change as additional or alternative dispositions are added to the database. For example, the disposition may include a suggestion to install a software patch, to run a maintenance procedure, to perform a repair procedure, to perform a specific further test (e.g., to check that power or signal cables are properly connected), to change a system setting, or to obtain additional information from another source.

According to one embodiment of the present invention, the rules based analysis of the disposition of the client computer 108 includes storing information returned from the execution of diagnostic tools including scripts 424 in the database 212. In particular, the information returned to the server 104 is stored in various records 420 maintained or created in the database 212. In general, the information contained in a record 420 may be limited to information concerning a particular device or type of device associated with the client computer 108. In particular, information regarding components, devices or software associated with a client computer 108 may be stored in database records 420 that contain information directed to a particular component, device or software program associated with the client computer 108. Where the user has specified a component, device or software program as problematic, the record 420 containing information concerning the identified item may be queried to determine whether the item successfully passed earlier diagnostic tests. For instance, the record 420 may be queried to determine whether the item passed or failed the earlier test. A new record 420 containing disposition information may then be created, to store information related to the item. Next, a table in the database 212 containing support information may be accessed by the server application 224. In general, the table containing support information comprises records 420 pertaining to problems and solutions for various components, devices or software associated with client computers 108. In general, a disposition stored in a record included in the disposition table directed to the same problem detected or identified in connection with the particular client computer 108 being diagnosed is returned to the client computer 108. The particular disposition returned may vary depending on whether the component, device or software program was found to have passed or to have failed earlier tests. Furthermore, it should be understood that the particular disposition may include a plurality of suggested dispositions.

The particular disposition returned initially to the client computer 108 is, according to one embodiment of the present invention, the solution that has been determined to be the most likely one to remedy the identified problem. If the initial disposition is not successful in remedying the identified problem, additional dispositions may be provided. Furthermore, 5 the disposition returned to a client computer 108 may change from one session to another as information regarding solutions that are successful in remedying particular problems is gathered.

The disposition is then returned to the client computer 108 (step 516). Where the disposition includes a suggested maintenance procedure, repair procedure, software fix or 10 change in system settings, that procedure may be carried out automatically. For example, the return of a disposition to the client computer 108 may include providing a script 424 for execution by the client application 400 that performs the suggested maintenance operation, repair procedure, software fix or change in system setting automatically. The operation may be an operation that can be carried out using a software application already installed on the 15 client computer 108, in which case the script 424 simply activates that application. Alternatively, the script 424 may itself include an executable program or command for carrying out the procedure.

If the suggested remedial procedure involves a software fix, the step of returning a disposition to the client computer 108 may include providing the necessary software patch or software program. For example, if a device driver has been found to be faulty, a software 20 patch or new driver may be downloaded to the client computer 108 and installed automatically. Additionally, if the error message indicates a missing software component such as .dll, .exe or call, the software component can be replaced or updated. In the case of a system setting that requires modification, the return of a disposition to the client computer 25 108 may include the provision of a script 424 that, when executed by the client application 400, is capable of making the required change to the system settings.

In the examples given above, implementation of the suggested fix may be automatic in that the user of the client computer 108 is not required to search for the maintenance procedure, software patch or system switch, and then implement the fix. Rather, the server 30 application 224, as part of the disposition, provides a script 424 and any additional software necessary to perform the procedure. According to one embodiment of the present invention,

the user of the client computer 108 is asked to authorize implementation of a suggested remedial procedure before it is carried out, to allow the user to control the changes that are made to the client computer 108.

In other instances, the disposition may include providing the user of a client computer 108 with a suggested solution to a diagnosed problem, but may require the user to implement the solution. For instance, a peripheral device 308 associated with the client computer 108 may require a new driver. However, that driver may not be available to the server application 224 for downloading to the client computer 108. In such instances, the disposition may include automatically directing the communications interface 404 to a website or universal resource locator (URL) address from which the user may be able to obtain the necessary driver. In other instances where the automatic solution of a problem is not possible, the disposition may provide the user with information regarding how to perform a required maintenance operation, or may provide contact information. For example, information regarding a maintenance operation may include instructions to the user on how to use a software utility, or on how to check a physical data or power connection between the CPU 300 and a peripheral device 308. Contact information may include a website address or a telephone number to allow the user to obtain the necessary information, software, or other fix.

In addition, a disposition may include a combination of automatic and manual fixes to problems. For instance, if a peripheral device 308 on the client computer 108 requires a driver that is not directly available to the server application 224, the communications interface 404 may be automatically sent to a website address from which the required driver may be available. The user may then obtain the required driver from the website. According to one embodiment of the present invention, a script 424 is then executed by the client application 400 to automatically install the driver obtained by the user.

It will be appreciated that, as used herein, a disposition may include more than one detected problem and suggested solution. For example, if a problem is detected with a printer 368 associated with a client computer 108, the user may be provided with a disposition that offers the following suggested solutions: tightening a loose communication cable, replacing a toner cartridge, and updating the printer driver. Furthermore, if multiple problems are detected on a client computer 108, the disposition returned to that client

computer 108 may include a description of all of the detected problems, and a suggested solution or a source of additional information for each of the detected problems.

The operation of a client application 400, in accordance with an embodiment of the present invention is depicted in Fig. 6. The initial state of the client application 400 after it has been downloaded to the client computer or device 108 is one in which it installs itself on the client computer or device 108 (step 600). After the self-install procedure has been completed, the client application 400 proceeds to step 604 in which the identifier assigned by the server application 224 to the client computer 108 is obtained from the communications interface 404. In general, the identifier is downloaded to the communications interface 404, and is placed in the title bar of the communications interface 404. In step 604, the client application 400 reads the identifier from the title bar of the communications interface 404. The identifier is thus provided to the client application 400 from the communications interface 404 over the identifier communication path 418. According to this embodiment, apart from the communication of the identifier to the client application 400, there is no direct communication between the client application 400 and the client communications interface 404. The described method for passing the identifier to the client application 400 is believed to be more reliable than other methods of passing this information, such as using "cookies," or methods that attempt to pass an identifier directly from the server application 224 to the client application 400. In addition, it is believed to be more reliable than using the network address of the client computer 108 as an identifier available to both the client application 400 and the communications interface 404. In particular, the described method ensures that the client application 400 and the communications interface 404 on a particular client computer or device 108 receive an identical identifier. The correct identifier is necessary in order to ensure that collected information and generated dispositions are associated with the same client computer or device 108, as will be described more fully below. Of course, other methods of transferring an identical identifier to the client application 400 and the communications interface 404 can be employed in accordance with the present invention, so long as they are reliable in operation.

At step 608, the client application 400 polls the server application 224 over a logical line of communication 412. In particular, the client application 400 polls the server application 224 to detect a "run" command in a script status field contained in a record 420

containing user information associated with the client computer or device 108. Upon detecting the value "run" in the script status field, the client application 400 downloads a next script 424 using logical line of communication 416 (step 612). At step 616, the client application 400 sets the script status field to a value "running." Next, at step 620, the client application 400 runs the downloaded script 424. The results obtained from running the script 424 are then returned to the server application 224 (step 624). The script status field is then set to a value "done" by the client application 400 (step 628). Next, the value of the script status field is set to a value "ready" by the client application 400 (step 632). The client application 400 then returns to step 608 to await detection of a next run command. In general, the next script 424 that is downloaded by the client application 400 is specified in a next script field included in the database record 420 containing user information. The specified script 424 is downloaded upon detection of the next "run" command in the script status field.

The operation of the communications interface 404 when used in connection with an embodiment of the present invention is depicted generally in Fig. 7. At step 700, the main page is displayed. The main page provides information regarding the diagnostic service, and a form for collecting identifying and billing information concerning the user. After the user has completed the registration form, the registration information is returned to the server application 224 using the first line of communication 408 (step 704). An identifier assigned by the server application 224 may then be downloaded to the communications interface 404 of the client computer 108 (step 708). Alternatively, the identifier may be assigned immediately, and passed to the communications interface 404 with the registration form. It is desirable to provide the identifier to the communications interface 404 early on in the diagnostic process, so that any information collected regarding the client computer 108 and the user can be distinguished from information collected from other client computers 108 and users.

At step 712, the communications interface 404 polls the script status field in the record 420 associated with the client computer 108. Upon detecting a "done" status in the script status field, the communications interface 404 displays the next page (step 716). The next page is indicated in a user section field of the record 420 containing user information. The next page may simply be informative, or may also serve to collect information from the

user. Where the next page only provides information, the communications interface 404 returns to step 712 to poll the server to detect a "done" status. Where the next page requires input from the user, the communications interface 404 will proceed to step 720. For example, a displayed page may request authorization from the user before a script 424 is executed. After the information requested from the user has been returned to the server application 224 (step 724), the script status field is set to "run" and the communications interface 404 returns to step 712. As part of returning the client selection to the server application 224, the communications interface 404 may set the script status field to "run", such as when the communications interface 404 has requested authorization from the user to execute a next script.

While the communications interface 404 waits for a "done" value to be detected, the previous page continues to be displayed (step 728). For example, the communications interface 404 may display the message "working" while the client application 400 is executing a script 424.

The polling procedures carried out by the client application 400 and the communications interface 404 allow the client application 400 and the communications interface 404 to be synchronized with one another. In particular, the client application 400 and the communications interface 404 use a field included as part of one of the records 420 maintained in the database 212 as a common point of contact. In this way, the operation of the client application 400 and the communications interface 404 is coordinated without requiring direct communication between the client application 400 and the communications interface 404.

With reference now to Fig. 8, test procedures or commands that may be performed in diagnosing a client computer 108 are illustrated. Initially, an inventory of the client computer 108 devices and registry settings may be taken (step 800). The inventory may be taken by an inventory module diagnostic tool comprising one or more scripts 424. The inventory module may utilize several different methods for obtaining an inventory of the devices installed in the client computer 108 and the client computer's 108 registry settings. For instance, the inventory module may search a registry of installed devices and parse out from current and prior registry entries information concerning those devices. The inventory module may also obtain information from system utilities included as part of the operating

system of the client computer 108. Additionally, the inventory module may obtain information from the basic input/output system (BIOS) of the client computer 108. In general, the inventory module may gather information from any file or software setting contained in the client computer 108 pertaining to devices currently or previously installed
5 on the client computer 108. Furthermore, the inventory module may collect information regarding general system resource and performance settings of the client computer 108.

The inventory module may also collect information concerning the client computer 108 from the user. For example, the inventory module may include activating the communications interface 404 to ask the user to enter the name of the last program installed
10 and the last program or file downloaded. The information gathered by the execution of the inventory module may be returned by the client application 400 to the server application 224 for storage in the database 212 as a part of a device inventory record 420 associated with the client computer using the identifier assigned to that client computer 108. Alternatively, the information concerning inventoried items is stored in a plurality of tables or records 420. For
15 instance, a first record 420 may be provided for storing information concerning a hard disk drive, a second record 420 may be provided for storing information regarding a video adaptor, a third record 420 may be provided for storing information regarding a CD ROM drive, etc. In general, records 420 may be provided for each desired division of information concerning devices and settings related to the client computer 108.

20 At step 804, functional tests of detected devices are performed. These functional tests may be implemented by executing a script 424 comprising a functional test module. The diagnostic tools run as part of the functional tests confirm that devices detected by the inventory module are functioning. For example, the functional test module may address each of the detected devices to request a response from those devices to ascertain whether those
25 devices are in fact installed in the client computer 108. The functional test module may also determine whether devices are operating properly. For example, the user may be instructed to insert media into devices such as floppy disk drives 340, CD ROM drives 344, tape drives 348, and other devices having removable media, and to put paper in the printer 368, etc. The functional test module may then test the ability of such devices to operate properly, such as
30 to perform read and/or write operations, to print, etc.

At step 808, performance or system data is collected. The performance data may include information on resource utilization, such as how much memory 332 is being used and how much space is available on the hard disk drive 340. Performance data may also include the actual speed at which the processor 312 is running. The collection of performance data may be performed by a performance data module comprising one or more scripts 424.

User input regarding the problem or problems to be diagnosed may be obtained at step 812. According to one embodiment of the present invention, the user provides input by selecting from a drop down menu displayed by the communications interface 404. For instance, the user may indicate the type of problem by choosing a menu item labeled "hardware," "software," "performance," or "don't know". Action taken in response to the selected user input will be described in greater detail below.

Regardless of the type of problem selected, any additional test applications or maintenance procedures that may be indicated are run at step 816. Other test applications may comprise diagnostic tools that include specific utilities that may be downloaded to the client computer 108 when it is determined that such additional utilities or tests may be useful in diagnosing a problem on the client computer 108. The log files created by the tests or maintenance programs are examined, and all or selected portions of the log files may be stored in the database as part of one or more records. Log files may be generated by executing functional tests and/or maintenance programs that may include but are not limited to diagnostic tools such as the "scan disk" and "disk defragmentation" utilities.

Although it is preferred that the describe inventory module, test modules and test applications be used, it should be appreciated that less than all may be used. For example, it may be appropriate to use only one test module during a particular session.

The results obtained from executing the various test modules and test applications are returned to the server at step 820. According to alternative embodiments of the present invention, not all of the test results need be returned to the server as part of one batch of results. For instance, results may be returned to the server application 224 following execution of each complete test module, or following execution of each individual script 424.

At step 824, a rules based analysis is applied to the test results to obtain a disposition. Finally, at step 828, the disposition may be returned from the server application 224 to the client computer 108.

With reference now to Fig. 9, the operation of an embodiment of the present invention in response to a user's indication that the problem to be diagnosed is a hardware problem is illustrated. Initially, at step 900, the user selects the menu item relating to a hardware problem. At step 904, the user selects from a list of devices to further specify the problematic hardware component. According to one embodiment of the present invention, the list of devices comprises the devices detected by the execution of the inventory module. According to a further embodiment of the present invention, the list of devices includes hardware devices in addition to the hardware devices detected by the inventory module, in order to allow the user to indicate a problem with a device that was not detected by the inventory module. According to still another embodiment of the present invention, the user may be allowed to specify a problematic device by entering the name of the problematic device or a description of that device.

After receiving the user information regarding the problematic device, additional tests on the device itself or on related software may be performed (step 908). For example, additional test scripts may be downloaded to the client application 400 and executed. Also, device drivers, software versions, revision levels or hardware revisions associated with the identified device may be analyzed to determine whether patches or updates are available. In some cases, identifiable recall data or other pertinent manufacturer information may be relayed. The results of the additional tests and/or software analysis is returned to the server application 224, and a rules based analysis of those results is performed.

At step 912, the disposition arrived at as a result of the tests and analysis of test results performed at step 908 is returned to the client computer 108. In addition, the disposition obtained from the execution of the general test modules, as described in connection with Fig. 8, is returned to the client computer (step 916).

From the above description of the operation of an embodiment of the present invention, it can be appreciated that allowing a user to specify a hardware problem is advantageous. In particular, it allows a disposition addressing the specified device to be returned to the user, even when the general test modules do not detect such a device. For instance, a disposition returned at step 912 might include a suggestion that the user verify the proper connection of power and data cables to a device identified by a user as problematic, but that was not detected by the general test modules.

As part of the general test performed regarding the client computer 108, general system parameters and conditions may be analyzed. For example, the remaining space in the hard disk drive 336, fragmentation of the hard disk drive 336, the amount of hard disk drive 336 space occupied by discarded files, and the amount of memory 332 being used may be considered. Results regarding such general system parameters and conditions may be analyzed and a disposition returned to the client computer 108. The dispositions returned may include information for the user, a suggestion to perform a maintenance procedure or system setting, or a script 424 may be provided to the client application 400 to automatically perform or run a maintenance procedure or to automatically change a system setting. The disposition may also include a combination of disposition types. For example, the user may be provided with a disposition indicating that the hard disk drive 336 is fragmented, and a script may be provided to the client application 400 to automatically invoke a disk defragmentation utility already resident in the client computer 108.

With reference now to Fig. 10, operation of an embodiment of the present invention in response to a user's selection of a software problem (step 1000) is illustrated. At step 1004, the user is asked to select the type of software problem that is being experienced. For example, according to one embodiment of the present invention, the user may select from the following choices:

1. My program gives me an error message before it shows on my screen;
2. My program starts, but when I try to use it, it gives me an error message;
3. My program runs, but it does not act right when I use it;
4. My program looks like it does not start at all; and
5. My program clears my screen to blue and gives me an error message.

Of course, additional or alternative menu choices may be provided. According to one embodiment of the present invention, additional menu items may be added as the number of problems having associated dispositions in the database increases. In general, after the user has specified the type of software problem, the user is instructed to start the problematic program after the communications interface 404 closes (step 1008). At step 1012, the communications interface 404 is closed, while the client application 400 continues to run on the client computer 108. At step 1016, a timer is started in order to ascertain how much time is required for the client computer 108 to load the problematic program. At step 1020, it is

determined whether the timer has expired. If the timer has expired, the user is reminded to start the program if the user has not already attempted to do so (step 1024).

At step 1028, it is determined whether an error message has been generated in connection with the user's attempt to start the problematic program. If an error message has
5 been generated, the text of the message is parsed and returned to the server application 224 for a rules based analysis of that message (step 1032).

At step 1036, it is determined whether the program is frozen or will not load. If the program is frozen or will not load, the point at which execution failed is determined (step 1040). In particular, the executable program, .dll file, or other file causing the software to
10 hang-up or fail to load is determined. The information regarding the point at which execution /failed is returned to the server application 224 for rules based analysis.

The disposition obtained as a result of the rules based analysis or analyses conducted as a result of the user's selection of a software problem is then returned to the client computer (step 1044). In addition, the disposition obtained from a rules based analysis of the general
15 test results is also returned to the client computer 1008 (step 1048).

From the above description of the operation of an embodiment of the present invention, it can be appreciated that the present invention is capable of precisely identifying the nature of a software problem. In particular, the present invention can determine whether a problem with software is due to the operating system, a conflict with other programs or
20 shared components or the problematic software itself. This is achieved without requiring the user to do anything more than attempt to load the problematic program. In addition, it does not require a trained technician to analyze the problem. Instead, the results of the various tests are returned to the server application 224 and a rules based analysis of those results is performed by the server 104.

25 Fig. 11 illustrates the operation of an embodiment of the present invention in response to the selection of a performance problem by the user (step 1100). At step 1104, the user selects the particular type of performance problem that is being experienced. For instance, according to an embodiment of the present invention, the user may select from the following general types of performance problems:

- 30
1. My computer's performance in general is slow;
 2. My computer has difficulty opening any selected program; and
 3. My computer has a problem with a particular program or window.

At step 1108, it is determined whether the user has selected a problem with performance in general. If a general performance problem has been selected, a rules based analysis of the system settings is performed (step 1112). As will be appreciated by those of ordinary skill in the art, system settings may include the speed of the processor 312, the amount of free RAM 332, space allocated to virtual RAM on the hard disk drive 336, etc. In addition, a rules based analysis of the time required to open an application commonly found on client computers 108, the number of files on the hard disk drive 336, and the number of programs always running in the background may be performed.

At step 1116, it is determined whether a user has indicated a problem with the opening or operation of any selected program. If a problem with the opening or operation of any selected program has been selected, a rules based analysis of system settings (step 1112) is performed. In addition, a check for conflicts may be performed.

At step 1120, it is determined whether the user has selected a problem with a specific program or window. If yes, the software problem analysis procedure described above with respect to Fig. 10 is performed (step 1124). As described with respect to Fig. 10, the software problem analysis may include a rules based analysis of information returned to the server application 224 as a result of performing the software problem analysis.

From the description set forth above it can be appreciated that, in general, information concerning the type of problem specified is returned to the server application 224 and a rules based analysis of that information is performed. The analysis may further comprise an adaptive rules based analysis. After application of the rules based analysis of the returned information, regardless of the particular performance problem specified, a disposition is returned to the client computer 108 (step 1128). In addition, at step 1132, the disposition obtained from performance of the general test modules is returned to the client computer 108.

From the description set forth above of an embodiment of the present invention, it can also be appreciated that the specification of a performance problem may result in the performance of tests in addition to those performed during execution of the general test modules. In addition, from the example given above, it is evident that the procedure otherwise carried out in response to the specification of a software problem may also be performed in response to the specification of a performance problem. The above-described configuration of an embodiment of the present invention enables a user who perceives a performance problem on the client computer 108 to obtain a diagnosis of the problem

without needing to identify the nature of that problem with particularity. Accordingly, the present invention may allow a user to identify and fix a performance problem even if the user is not an experienced computer user.

Fig. 12 illustrates the operation of an embodiment of the present invention in response to a selection by the user indicating that the user does not know the nature of the problem (step 1200). In particular, a menu selection to indicate that the user does not know the nature of the problem allows a diagnosis to proceed even if the user is unable to ascertain whether the particular problem involves the hardware, software, or performance of the client computer 108.

10 In response to the selection of "don't know" as the type of problem in step 1200, according to one embodiment of the present invention, certain of the tests and analyses conducted in response to the selection of a performance problem may be conducted. In particular, the system settings and operating system settings may be subjected to a rules based analysis (step 1204). In general, any test procedure associated with any specified problem type may be conducted in response to the selection of "don't know" at step 1200. In particular, any test procedure that does not require the user to take any additional action, such as specifying a hardware device or software program causing problems, may be performed.

At step 1208, a disposition obtained from the specific and general tests performed concerning the client computer 108 is returned to the client computer (step 1208). In addition, information may be returned to the client computer 108 regarding common computer problems and how to fix such problems.

From the description of the operation of an embodiment of the present invention in response to an indication by the user that the specific type of problem is not known, it can be appreciated that any test can be performed on the client computer 108, so long as specific information from the user is not required. Of course, according to other embodiments of the present invention, tests that do not require additional input from the user may be performed regardless of the input regarding the particular type of problem selected by the user. The performance of such tests may provide a more accurate diagnosis of the problem or problems on the client computer 108. However, it may be desirable to limit the number of tests that are performed automatically, such as where the user has opted for only a basic diagnostic service, or where it is important to limit the time required to return a diagnosis.

According to another embodiment of the present invention, in response to a selection of "don't know", no additional tests are performed. Results obtained from test modules that have been executed are then subjected to a rules based analysis. In this way, any test results that indicate or that may indicate a problem with the client computer 108 can be identified.

5 A disposition may be returned to the client computer 108 with respect to each identified problem.

According to still another embodiment of the present invention, in response to the selection of "don't know", the user may be presented with an additional question or questions, in an attempt to more particularly identify the problem. For instance, the user may be asked
10 under what circumstances problems are encountered. Based on the user's answers, areas of potential problems can be identified. For example, such questions may be successful in narrowing the potential problem to a hardware problem, and test results concerning devices associated with the client computer 108 can be subjected to a rules based analysis.

With reference now to Fig. 13, the operation of an embodiment of the present
15 invention in returning a disposition to the client computer 108 is illustrated. Initially, at step 1300, the results returned to the server application 224 as a result of the performance of tests on and gathering of information from the client computer 108 are entered into records 420. In general, at least one record 420 associated with the client computer 108 from which the results were obtained is created in the database 212. According to an alternative embodiment
20 of the present invention, a plurality of records 420 associated with a particular client computer 108 are created. The creation of multiple records allows the results to be categorized, thereby simplifying the analysis and retrieval of stored information. Multiple records in a single category may be created where, for example, there are multiple devices in that category. For instance, a record 420 in the category of "storage devices" may be
25 provided for a first hard disk drive 336, a floppy drive 340, and a second hard disk drive 336 detected in a single client computer 108. In general, all of the records 420 associated with a particular client computer 108 include a field containing the identifier assigned to that client computer 108, so that the stored information can be associated with the correct client computer 108.

30 At step 1304, a rules based analysis of the information stored in the database records 420 is performed. According to one embodiment of the present invention, the information is analyzed as discrete pieces or sets. For example, a rules based analysis may first be

performed concerning a hard disk drive 336 installed on the client computer 108. More particularly, the rules based analysis may obtain information from a record or records 420 containing only information concerning a hard drive 336, or only information concerning the hard drive 336 may be taken from a record or records 420 containing other information, for
5 analysis. A second rules based analysis may then be performed concerning another detected device or aspect of the client computer 108, such as a CD ROM 344 or printer 368. In general, it can be appreciated that a series of rules based analyses may be performed as required or indicated by the detected devices, software and parameters concerning the client computer 108, or as indicated by the type of problem specified by the user.

10 As described more fully above, the rules based analysis of information may comprise reviewing the collected information to determine whether an anomaly or potential conflict is present.

At step 1308, it is determined whether a potential problem is indicated as a result of the rules based analysis. If a potential problem is found, any potential dispositions associated
15 with the indicated problem are stored (step 1312). For example, a record 420 may be provided for storing any such potential dispositions. As with other records 420 associated with a particular client computer 108, the record or records 420 may be associated with the client computer 108 to which the disposition pertains by assigning the identifier used to identify the client computer 108 to the record or records 420.

20 At step 1316, it is determined whether any additional test results or information returned from the client computer 108 require analysis. Accordingly, where the returned results are analyzed as discrete sets of information, the system will cycle through steps 1304, 1308, 1316 and if a problem is found, step 1312, until no results or information requiring analysis remain. The potential disposition or dispositions are returned to the client computer
25 108 at step 1320.

The disposition returned to the client computer 108 may comprise a suggested action to remedy a detected problem, may provide information regarding a source of further information regarding the detected or potential problem, or may send the user to a site containing relevant information. For instance, a returned disposition may comprise a
30 suggestion that the user execute a particular utility program or perform a physical check of a device. In addition or as an alternative to suggesting a particular procedure, the disposition may provide information, such as an Internet address (e.g., a Universal Resource Locator)

or telephone number of a source of further information, such as the manufacturer of a problem device or program. The disposition may also comprise an inventory of installed devices or software, and may include information regarding the status of the devices or software.

5 The disposition may also include provisions to automatically initiate remedial action. For example, the user may be asked to authorize the performance of the suggested maintenance procedure. Upon receiving the requested authorization, a script 424 may be provided to the client application 400 for execution. The script 424 may itself comprise a utility application, or may comprise the programming code necessary to initiate operation of
10 a utility program stored on the client computer 108. In either event, the procedure may be performed without requiring the user to do anything more than authorize execution of the procedure. It should be noted that scripts 424 run during the diagnostic procedure prior to the return of a disposition to the client computer 108 may have remedied the problem or problems that caused the user to seek a diagnosis and solution. For instance, according to
15 one embodiment of the present invention, disk maintenance utilities provided as part of a script or scripts 424 may automatically be run during diagnosis of the client computer 108. These utilities may be effective in remedying the problem with the client computer 108, without requiring further repair. In such instances, the disposition returned to the client computer 108 may comprise notice to the user that a problem with a component (e.g. the hard
20 disk drive 336) was detected, but was fixed when a provided disk maintenance utility was executed (e.g., SCAN DISK). The utilities may be generally available programs, such as SCAN DISK, or they may be specifically developed for use in connection with the present invention.

 If a problem with a particular piece of software is detected, the disposition may
25 include the provision of a software patch, missing component, or replacement of the software to remedy the problem. Accordingly, the disposition may be provided with a request that the user authorize replacement of the faulty software. In response to receiving such authorization, the software patch or replacement may be downloaded to the client computer 108 for installation. The software patch or replacement may be automatically installed by
30 the client application 400. If the required software patch or replacement is not available from the server 104, the communications interface 404 may be directed to a website where the required software is available. The user may then download the required software to the

client computer 108. According to one embodiment of the present invention, the downloaded software may be automatically installed by the client application 404.

It should be appreciated that multiple dispositions may be returned to the client computer 108. For example, a suggestion to perform a maintenance procedure to improve the performance of a hard disk drive 336 installed on the client computer 108 as a first disposition may be accompanied by a suggestion to replace a device driver for that disk drive 336. In addition, dispositions may concern more than one device or piece of software associated with a client computer 108.

The operation of an embodiment of the present invention will now be illustrated in the context of an example. Initially, the user contacts the server 104 over the computer network 112 using the communications interface 404 of the client computer 108, such as an Internet browser (step 500). The user is presented with a browser page describing the diagnostic service. If the user decides to continue, a registration form is presented to the user by the communications interface 404. The registration form or page allows the user to submit general and billing information. For example, the user is asked to enter his name, address, and billing information such as a credit card number and card expiration date. The user may choose to submit the registration form after entries have been made in all of the required fields of that form. The information submitted is stored in a record 420 containing user information.

The record 420 containing user information includes a field for storing an identifier that is unique to the particular client computer 108 that will be diagnosed. The identifier is assigned by the server application 224 when the user submits information from the registration form. In general, all communications and records 420 with respect to a particular client computer 108 are identified by the same identifier. In this way, information passed between the server 104 and the client computer 108, or stored in the database 212, can be properly associated with the correct client computer 108.

Following registration, the communications interface 404 displays a next page to the user. The signal to display a next page is communicated to the communications interface 404 by setting a script status field included in the record 420 containing user information to a value "done" upon completion of the collection and/or verification of registration information. The identity or address of the next page to display is contained in a next page field included in the record 420 containing user information. In general, the communications

interface 404 may detect a change to the script status field by polling the server application 224 (step 712). The next page displayed (step 716) is, according to the present example, a page informing the user that components of the client executable package 220 will next be downloaded and installed on the client computer 108, and request authorization from the user to commence with the download and installation. Upon receiving the required authorization, here signaled by having the user click on a button displayed by the communications interface 404, the client application 400 is downloaded to and installed on the client computer 108 (step 504).

After it has been downloaded, the client application 400 self installs itself on the client computer 108 (step 600). In order to ensure that information returned to the server application 224 is associated with the relevant client computer 104, the client application 400 must be provided with the identifier that has been assigned to the client computer 108. According to the present example, the identifier is provided to the communications interface 404, and displayed in the title bar of the communications interface 404 window. Thus, upon completing installation, the client application 400 reads the identifier from the title bar of the communications interface 404. In this way, the identifier is reliably communicated to the client application 400. According to the embodiment of the present example, the reading of the identifier from the title bar of the communications interface 404 is the only direct communication between the client application 400 and the communications interface 404.

The client application 400 then polls the server application 224. In particular, the server application 400 polls the server application 224 to detect a "run" value in the script status field of the record 420 containing user information. Because the client application 400 has been provided with the identifier for the client computer 108 on which it is installed, the client application 400 monitors only the record 420 having user information concerning the relevant client computer 108 (step 608). Upon detection of the "run" command, the client application 400 downloads an application script 424 (step 612). After the download of the script 424 is complete, the client application 400 sets the script status field in the record 420 containing user information to "running" (step 616) and executes that script (step 620).

According to the present example, the first script 424 conducts an inventory of devices installed on the client computer 108 and the registry settings in the client computer 108. In general, the information regarding installed devices and registry settings may be collected by queries made to the operating system of the client computer 108, such as by

querying standard system settings and device information, and by extracting information from files concerning installed devices and registry information using programming designed to parse such information from such files. Additional information may be obtained by querying the system basic input/output system (BIOS). Execution of the device inventory and registry setting module may comprise the execution of one or a plurality of scripts 424.

Following the execution of the device inventory and registry settings test module, the results obtained are returned to the server application 224. The server application 224 stores the returned information in database records 420. According to the present example, a separate database record 420 is provided for storing information related to various devices, manufacturers, and system settings. For example, a separate database record 420 may be provided for each of the following categories of information: monitor information; port information; printer information; storage device information; system information; video adaptor information; performance information; software information; and audio information.

Multiple records 420 of a particular type may be provided in connection with a particular client computer 108. For instance, a client computer 108 having three active communication ports will have three records 320 for containing port information.

Following execution and the return of information to the server application 224, the client application 400 sets the script status field in the record 420 containing user information to "done" (step 628). The communications interface 404 detects the change of the script status field to "done" because it has been polling that field (step 712) while the client application 400 has been executing the script 424. The communications interface 404 then displays a next page (step 716) to the user. According to the present invention, a plurality of scripts 424 comprise the device inventory and registry settings test module. Accordingly, the server application 224 may change the script status field to "run" immediately after the client 400 has indicated that it is ready to execute a next script 424 by changing the script status field to "ready" (step 632). Thus, the process of downloading a script 424 and executing that script 424 continues until all of the scripts 424 needed to be run in connection with the device inventory and registry settings module have been executed.

Next, functional tests are performed on the detected devices. According to the present example, the client computer 108 includes a hard disk drive 336. Accordingly, one of the functional tests that will be performed includes a hard disk drive diagnostic program.

In addition, the client computer 108 according to the present example includes a floppy disk drive 340. Accordingly, one of the functional tests that will be carried out on this client computer 108 includes a test of the operation of the floppy disk drive 340. Because a more complete test can be performed on storage devices having removable media, such as floppy disk drives 340, if the media is installed, the user is asked to insert media into all installed drives at step 716. After the user has done so, the user signals this to the server application 224 by clicking a button displayed by the communications interface 404 to indicate that functional testing may commence (step 720). The user's indication is returned to the server application 224 (step 724), at which point the script status field is changed to "run."

As described above, the client application 400 detects the "run" value in the script status field, downloads the next script 424 (step 612), sets the script status field to "running" (step 616), runs the script (step 620), returns results from the execution of the script to the server application 424 (step 624), sets the script status field to "done" (step 628), and then changes the script status field to "ready" (step 632). The information collected by execution of the scripts that comprise the functional test module is, according to the present example, returned to the server application 224 after the execution of each script 424. The information is stored in the records 420 created for the previously detected devices and registry settings. Accordingly, the information returned to the server 104 as the result of the execution of the functional test module may be stored as entries in records 420 that have previously been created.

According to the present example, performance data is next collected. The execution of the scripts 424 comprising the performance data test module, and the return of information thus collected to the server 104 proceeds essentially as described above with respect to the execution of the device inventory and registry settings module and the functional test module. As before, the performance data information may be stored in one or more records 420 that were created earlier for storing information concerning the client computer 108.

An inventory is displayed of all devices and settings as well as software executables (.exe). The user is next asked to provide information regarding what the user perceives to be the problem requiring diagnosis (step 812). For example, the user may be asked which program last loaded, last Internet download, etc. According to the present example, the user indicates that the client computer 108 has a hardware problem (step 900). The user is then presented with a list of devices detected in the client computer 108 (step 904). The user is

also presented with a list of devices typically found in a client computer 108. For purposes of the present example, we will assume that the user indicates that the CD ROM drive 344 is problematic. We will further assume that the CD ROM drive 344 was not detected by the device inventory and registry settings test module. Because the CD ROM 344 was not
5 detected, no additional tests are performed relating to such a device (step 816 and 908).

Next, any information concerning the client computer 108 remaining to be returned to the server 104 is provided to the server application 224 (steps 820 and 912).

The server application 224 then applies a rules based analysis to the information stored in the records 420 concerning the client computer 108. For purposes of the present
10 example, we will assume that no problems regarding devices detected as being installed or detected registry settings are considered to be problematic. However, the user's indication of a problem with a CD ROM drive 344 does require diagnosis. According to the present example, no CD ROM 344 was detected as installed on the client computer 108. This suggests that the CD ROM 344 is not properly connected to the client computer. Therefore,
15 the disposition returned to the client computer 108 (steps 828, 912, and 916) may suggest that the user ensure that the signal and power cables between the client computer 108 and the CD ROM 344 are intact and properly connected.

From the above example, it can be appreciated that the user was provided with a diagnosis of the problem on the client computer 108, without requiring the assistance of a
20 human technician. Furthermore, although in the present example the user provided information concerning the perceived problem, the user was not required to describe the problem with any particularity. In addition, the fully automated test procedure, in combination with the user input, provides a more narrowly focused disposition than might otherwise be available. For instance, without the automatic device inventory and review of
25 system settings, suggested remedial measures would necessarily be broader. For instance, a system that did not prepare an automatic inventory might instruct the user to update the driver for the CD ROM 344, or ask the manufacturer of the drive for assistance. However, the present invention, as illustrated in the foregoing example, is capable of providing a narrowly focused suggestion for remedying the problem. Accordingly, the present invention
30 is capable of streamlining the process of diagnosing and remedying problems on a client computer 108.

The operation of the present invention will now be described in the context of a second example. According to this second example, the operation of the present invention proceeds as described above in the previous example. However, according to this example, the user selects a performance problem (steps 812 and 1100). Next, the user selects the particular type of performance problem being experienced (step 1104). According to the present example, the user indicates that there is a problem with a particular program (step 1120).

Because the user has indicated a problem with a particular program, a software performance analysis is begun (step 1128). In particular, the user is instructed to attempt to start the problematic program after the communications interface 404 has closed (step 1008). Next, the communications interface 404 automatically closes (step 1012) and a timer is started (step 1016).

The user then clicks on the problematic program or otherwise attempts to load it. According to the present example, we will assume that the program freezes while it is loading (step 1036). At step 1040, it is determined at which point loading of the program failed. In the present example, it is determined that the program freezes when a particular file is being loaded. Information concerning this file is returned to the server application 224 and a rules based analysis is performed (step 824).

The disposition returned to the client computer 108 (step 828 and 1044) may inform the user of the name of the file or component being loaded when the program freezes, and may request authorization from the user to replace that file or component. The application server 224 may then retrieve a copy of the affected file, for example, from a website operated by the software producer. The system 100 may then automatically install the patch or replacement file in the client computer 108.

As illustrated by this second example, the present invention is capable of precisely determining the problem being experienced by a user in connection with a particular piece of software. Furthermore, the present invention is capable of providing the user information regarding the problem, and of remedying the problem. It is further apparent that the present invention is capable of diagnosing a problem even where the user is unable to describe the problem with specificity.

In connection with a particular problem device or software application, the disposition returned to the client computer 108 may include self-help tutorials for consideration by the

user. A listing of devices and software applications that may have associated self-help tutorials available in accordance with an embodiment of the present invention is shown in Fig. 14. As shown in Fig. 14, different entries may be provided for different device types. For example, a first set of self-help tutorials may be provided for IDE CD-ROM drives, a second set for SCSI CD-ROM drives, a third set for USB CD-ROM drives, and fourth set for FireWire CD-ROM drives. Of course, a greater or lesser variety of devices and software applications may be associated with available self-help tutorials.

According to one embodiment of the present invention, potential dispositions are considered sequentially to determine whether they are relevant. For example, for each potential problem device or software application that is or may be associated with a client computer 108, a determination is made as to whether a problem has been indicated. A problem may be indicated either by the detection of anomalous test results obtained in connection with the client computer 108, or by the user. As an example of anomalous test results indicating a problem, a CD-ROM drive may be found to be incapable of reading data. As an example of a user indicated problem, the user may indicate manually that a floppy drive 340 is inoperative. A determination is then made as to whether a sub-problem associated with the problem device or software application has been indicated. For each indicated subproblem, a disposition containing a self-help tutorial may be returned to the client computer 108 for consideration by the user. If no problem is indicated with respect to a particular device or software application, the next device or software application is considered. For example, if no problem with a floppy drive 340 is indicated, no self-help tutorial regarding such a device is returned to the user. The server 104 then continues to determine whether problems have been indicated with a next device or software application. For example, with reference to Fig. 14, after a determination is made as to whether self-help tutorials regarding a hard disk drive should be provided, whether problems with a hard disk drive 336 have been indicated is considered.

With reference now to Fig. 15, a flow chart depicting a process of considering potential dispositions in accordance with an embodiment of the present invention is illustrated. At step 1500, the disposition determination process starts. A counter *i* is set equal to 1 at step 1504. In general, a unique value *i* may be sequentially assigned to each device or software application heading included in the possible dispositions associated with the invention. At step 1508, a determination is made as to whether a problem has been

indicated with respect to device *i*. If a problem is indicated with device *i*, the system proceeds to determine whether a subproblem is indicated with respect to device *i* (step 1512). If a problem is indicated, the disposition for the indicated subproblem is returned to the user (step 1516). Next, at step 1520, *i* is set equal to *i* + 1. The value *i* is also set equal to *i* + 1 (step 1520) if at step 1508 no problem has been indicated, or if at step 1512 no subproblem has been indicated. At step 1524, a determination is made as to whether there is a device corresponding to the value for *i*. If there is an *i*th device then the system returns to step 1508. If there is no such device (*i.e.* all devices having associated dispositions have been considered), the procedure ends (step 1528).

From the above description, it can be appreciated that the system proceeds to consider whether a problem is indicated with each hardware device or software application, and returns a disposition addressing any indicated problems and subproblems. As noted above, each such disposition may include self-help tutorials. In addition or alternatively, each such disposition may include automated fixes and/or referrals to other sources of information.

An example of the steps taken and information received by a user of a client computer 108 in connection with diagnosing the client computer 108 in accordance with an embodiment of the present invention will now be given. Initially, the user directs a communications interface (*e.g.*, an internet browser) 404 associated with the client computer 108 to a diagnosing resource (*e.g.*, a web site) associated with the server 104 over a computer network (*e.g.*, the Internet) 112. The user is then presented with a welcome screen 1600 describing the diagnostic service (see Fig. 16). From the welcome screen 1600, the user may choose to proceed with obtaining a diagnosis by selecting a next button 1604.

After a user selects the next button 1604, the user is presented with a disclaimer and a security notification page 1700 (see Fig. 17). If the user agrees to the terms of the service, a next button 1704 may be selected, and the user is then presented with a minimum systems requirement page 1800 (see Fig. 18). The minimum systems requirements page 1800 may provide hypertext links 1804, 1808 that the user may select for additional instructions and alternative download methods. A next button 1812 is provided to allow the user to choose to continue with installation of the client application 400.

Upon selection of the next button 1812, and before the client application 400 is downloaded to the client computer 108, the user may be presented with an authenticity certificate. The authenticity certificate may include verification of the identity of the

software publisher by a third party provider, such as VeriSign Commercial Software Publishers CA™. If the user wishes to continue with the download and installation of the client application 400, the user may select a next button provided in connection with the authenticity certificate. Upon selecting the next button, the progress of the installation
5 process is presented to the user by a window in both bar graph and percentage forms.

After the client application 400 has been downloaded and installed, the user is presented with a log-in page 1900 that includes a window 1904 showing the user ID (*i.e.* the identifier) that has been assigned to the client computer 108 (see Fig. 19). The user ID is unique to the client computer 108, and is maintained for that client computer 108 such that
10 the same user ID is assigned to a client computer 108 each time the diagnostic service is utilized by that client computer 108. The screen may further provide a log-in name window 1908, and a password window 1912. If the user does not yet have an assigned log-in name and password, a button or hypertext link 1916 is provided to allow the user to purchase a subscription for the service. Upon clicking on the link 1916, the user is presented with a
15 subscription purchase page 2000 (see Figs. 20A and 20B).

The subscription purchase page 2000 may be generated in connection with the communications interface 404. Therefore, it can be appreciated that the communications interface 404 remains in communication with the server 104, and that the communications interface 404 may be used for communicating general information between the server 104
20 and the client computer 108, even when the client application 400 is in communication with the server 104. The subscription purchase page 2000 allows the user to choose from a variety of subscription levels, such as a one-time diagnosis 2004, or a one-year subscription 2008, by selecting the appropriate button. The user may also be presented with various payment options 2012, together with windows 2016 for entering information required for the selected
25 payment options. In addition, buttons 2020 may be provided for collecting additional information from the user. A submit button 2024 is provided to allow the user to submit the entered information for approval.

Following approval, the user is allowed to select a log-in name and password from a log-in name and password selection page 2100 (see Fig. 21). The user may then select a
30 continue button 2104 to return to the log-in page 1900 (see Fig. 19). The user may then select the log-in button 1920 to proceed with obtaining a diagnosis of the client computer 108. It should be noted that the particular client computer 108 in contact with the server 104

is diagnosed during a typical session. Furthermore, a unique user I.D. is assigned to each client computer 108 that has initiated diagnosis procedures. However, a single log-in name and password may be used in connection with the diagnosis of different client computers 108. Accordingly, a company or household may use a single log-in name and password to
5 diagnose all of its client computers 108.

After selection of the log-in button 1920, the user is presented with a functional test sequence welcome page 2200 (see Fig. 22) which provides the user with information regarding steps that should be taken to ensure an accurate diagnosis of the client computer 108. For instance, the user may be instructed to insert media into all storage devices having
10 removable media. For example, the user may be instructed to insert a disk into the floppy drive 340, a zip cartridge into a zip drive 350, or a cartridge or a tape into another storage device 348 or 350 having removable media. By selecting a next button 2204, the user is presented with a test in progress page 2300 (see Fig. 23).

The test in progress page 2300 informs the user that the client computer 108 is being
15 tested, and warns the user not to stop the procedure until the testing has been completed. The user may also be provided with information concerning what to expect while testing is being conducted. For example, the user may be informed that the client computer 108 can be expected to make various sounds and that the screen of the monitor 352 may blink.

After testing has been completed, the user is presented with a system information
20 report page (see Figs. 24A-C). The system information report page 2400 may include general system information 2404, such as information regarding the CPU 312, the operating system software 336, the BIOS, available space on the hard disk drive 336, and the total amount of memory 332 available on the client computer 108.

In addition, the system information report 2400 may include information regarding
25 various peripheral devices. For example, information 2408 may be provided regarding input/output devices 364, such as a sound card. The sound card information 2408 may include a description of the sound card 364, the manufacturer, model, and any problem codes. In addition, test results may be indicated. With respect to the system information report 2400, the test results for various devices may be indicated as passed or failed.

30 Other peripheral devices, such as storage devices, for which information may be provided include a CD ROM 344. The information 2412 concerning the CD ROM may

include the assigned drive letter, a description of the device, the manufacturer, model, problem codes, and test results.

Test results for installed printers 368 may also be provided by the system information report 2400. The information 2416 regarding installed printers 368 may include a description, manufacturer, model name, problem codes, and test results. The printer test results 2416 also illustrate the use of messages in the system information report 2400 particular to certain devices. For example, the system information 2416 regarding the printers 368 notes that a printer must be turned on in order to be detected. In this way, the user may be notified of conditions that may cause unexpected test results.

Information 2420 regarding a floppy drive 340 may also be provided. Such information 2420 may include the assigned drive letter, description of the device, manufacturer, model, problem code, and test results.

The system information report 2400 may also provide information 2424 regarding detected user interface devices, including the monitor 352. The information 2424 regarding the monitor may include a description, manufacturer, model and problem code.

Information 2428 regarding devices related to user interface devices may also be provided by the system information report. For example, video adaptor information 2428 concerning the video card 324 may be provided, and may include a description, manufacturer, model, problem code, and test results.

Test results for detected hard disk drives 336 may also be included in the system information report 2400. The hard disk drive information 2432 may include the assigned drive letter, the assigned drive number, a description of the device, the manufacturer, model, storage size, problem codes and test results.

Information 2436 regarding user input devices, such as pointing devices 360 may include a description of the device, manufacturer, name, problem code and test results.

The test results shown in the system information report 240 may include information 2440 concerning network or modem connections (*i.e.* network interfaces) 320. This information 2440 may include a description of the modem or network, manufacturer, model, problem code, and test results.

Information 2444 regarding ports provided as part of the client computer 108 may also be displayed as part of the system information report 2400. This information 2444 may

include a description of the port, the manufacturer, if any, the model, problem code, and test results.

Information 2448 regarding a universal serial bus included with the client computer 108 may be provided separately from information 2444 regarding other ports. This
5 information 2448 may include a description, manufacturer, model, problem code, and test results.

A software inventory 2452 may also be presented to the user as part of the system information report 2400. The software inventory 2452, according to an embodiment of the present invention, lists all software applications 384 that are registered with the operating
10 system software 380 running on the client computer 108.

The system information report 2400 may be provided with a next button 2456. Upon selecting the next button 2456, the user is presented with a problem selection page 2500 (see Fig. 25).

The problem selection page 2500 allows the user to select from one of a variety of
15 problem types 2504. For example, the user may select a hardware problem 2508, or a software problem 2512. In addition, the user may indicate that the client computer 108 runs slowly 2516, that the client computer 108 locks up 2520, that the user cannot retrieve a file or program 2524, or that the user is not sure of the nature of the problem 2528. Accordingly, the problem selection page 2500 allows a user to describe a problem in general terms. In
20 particular, the problem selection page 2500 does not require that the user describe the problem in technical terms, or with any great specificity. Therefore, the present invention can be used even by users with little or no technical experience.

In response to the selection of a hardware problem 2508, the user is presented with a hardware problem selection page 2600 (see Figs. 26A-C). The hardware problem selection
25 page 2600 enumerates the various hardware devices detected during testing of the client computer 108. That is, the user is presented with a list of hardware devices that have been detected. By clicking on a link describing the hardware device, the user may specify the selected device as having a suspected problem.

In addition, links are provided to allow the user to indicate that a hardware device that
30 the user believes is associated with the client computer 108 has not been detected. It will also be noted that for devices that were not detected, for example a tape device in the example hardware problem section page 2600, only a link for indicating that a tape drive is not shown

is provided. Accordingly, the user can indicate problems, and therefore receive a disposition, with respect to devices that were not automatically detected.

As an example of how the hardware problem selection page 2600 may be used to diagnose a problem and assist the user in correcting the problem, it will be assumed that the user is experiencing problems with the monitor or video display 352. To indicate a problem with the monitor 352, the user need only select a hardware problem from the problem selection page 2500, and select the link 264 associated with the detected monitor 352.

In response to the selection of the monitor 2604 link, the user is presented with a monitor problem solution page 2700 (see Fig. 27). The monitor problem solution page 2700 allows the user to select from particular problems that the user may be experiencing with the monitor 352. For example, the user may select a "loses picture" link 2704 if the picture on the monitor 352 is lost or goes on and off. A "bad or distorted picture" link 2708 may be selected if the picture on the monitor 352 is distorted, making shapes out of perspective, or the picture is unclear or hard to read. A "resolution or color problems" link 2712 may be provided if print looks smaller/larger or color or text is not crisp or has changed.

For purposes of the present example, it will be assumed that the user selects the link 2708 indicating that the monitor 352 has a bad or distorted picture. In response, a bad or distorted picture solution page 2800 (see Figs. 28A-B) is presented to the user. The bad or distorted picture solution page 2800 presents a number of steps that the user can follow in an attempt to correct the indicated problem. A first step 2804 involves checking the driver software for the monitor 352. By selecting a "show me fix" button 2808, the user can access step by step procedures for determining whether an incorrect driver has been installed. In particular, in response to a selection of the "show me fix" button 2808, the user is presented with a video driver problem solution page 2900 (see Figs. 29A-B).

The video driver problem solution page 2900 is an example of a self-help tutorial disposition, and provides the user with information regarding problems that can be experienced if an incorrect video driver is used in connection with a monitor 352, and in particular with the client computer's 108 video card 324. In addition, the user is provided with instructions for updating the video driver. For instance, the user is instructed to insert a disk or CD provided by the manufacturer of the video card 324 to install the correct driver. In addition, the user may be provided with instructions for locating an appropriate driver on the web site of the manufacturer of the video card 324. According to an embodiment of the

present invention, a link (e.g., a Universal Resource Locator) is provided by the server 104 to the client computer 108 that may be selected by the user to enable the user to conveniently access the manufacturer's web site using the communications interface 404. After the indicated procedures have been completed, the user may select a link 2904 to return to the bad or distorted picture solution page 2800. Upon returning to the bad or distorted picture solution page 2800, the user may select the buttons 2810 indicating that step 1 2804 has been completed. Step 1 2804 is then removed from the bad or distorted picture solution page 2800.

If step 1 2804 is unsuccessful in correcting the observed problem, the user may proceed to step 2 2812, which is directed to correcting a bad or distorted picture in the monitor 352 as a result of loose cables. For specific information, the user can select the "show me fix" button 2816. Upon selection of the "show me fix" button 2816, the user is presented with a video connector problem solution page 3000 (see Figs. 30A-B).

The video connector problem solution page 3000 is another example of a self-help tutorial disposition, and explains to the user that disconnected or defective cables, or damaged connector pins, can cause the picture displayed by the monitor 352 to be of poor quality, or to be distorted. In addition, the video connector problem solution page 3000 can describe to the user actions that the user can take to ensure that the connections have been properly made. For example, the user can be instructed to verify that the cable is inserted properly into the provided connector on the back of the computer, and that the cable is tightened to the video card 324 with the attaching screws provided as part of the cable. Photographs 3004 may be provided to illustrate for the user the physical configuration of the cables and connectors that the user is to check. Upon completion of the indicated procedures, the user may select a link 3008 to return to the bad or distorted picture solution page 2800. From the bad or distorted picture solution page 2800, the user may indicate that step 2 2812 has been completed by selecting the "done" button 2818. Step 2 is then removed from the bad or distorted picture solution page 2800.

With continued reference to Fig. 28, the user may proceed to step 3 2820, for example if the previous steps have been unsuccessful in solving the indicated problem. Step 3 2820 is directed to a video slot that has a conflict or is not properly installed. By selecting the "show me fix" button 2824, the user is presented with a video card connection problem solution page 3100 (see Figs. 31A-B). The video card connection problem solution page

3100 is yet another example of a self-help tutorial disposition, and describes the symptoms of a video card 324 that is not completely inserted into the corresponding slot or connector provided by the client computer 108. In addition, the steps that the user may take to ensure that the video card 324 is properly connected is described. Photographs 3104 may be provided to illustrate for the user the video card 324 and the slots for receiving the video card 324. After the described procedures have been performed, the user may select a link 3108 to return to the bad or distorted picture solution page 2800. The "done" button 2826 associated with step 3 2820 may then be selected to remove step 3 2820 from the bad or distorted picture solution page 2800.

Step 4 2824 addresses fixes for a bad or distorted picture caused by a bent pin on the cable or video card 324. By selecting the "show me fix" button 2832, the user is presented with the video connector problem solution page 3000 (see Fig. 30). Therefore, it can be appreciated that certain of the actions that may be performed by a user as self help may be repeated. In a typical repair scenario, the user will not perform all of the fixes that can be accessed from a problem solution page. Thus, in the present example, the user need not access all of the potential fixes available from the bad or distorted picture solution page 2800 (Fig. 28). This is because a user will likely have fixed the problem that can be solved by a particular fix, and therefore any symptoms associated with such a problem will have disappeared by the time the user arrives at the second instance of a particular solution. In addition, a user may not have all of the symptoms that may be associated with a particular solution. Again, the user is therefore unlikely to happen upon a repeat of a previously suggested fix during a problem solution session. Upon returning to the bad or distorted picture solution page 2800 by selecting the completed link 3008, the user may remove step 4 2824 by selecting the "done" button 2834.

If the previous steps have been unsuccessful at solving the problem or problems being experienced in connection with the client monitor 352, the user may select step 5 2836, directed to a video driver that may not support a particular application program, or a video card 324 that may not be new enough to run that application. By selecting the "show me fix" button 2840, the user is presented with a video card capability problem solution page 3200 (see Fig. 32). The video card capability problem solution page 3200 is still another example of a self-help tutorial disposition, and may explain that certain video cards 324 are not capable of supporting all software applications 384. Accordingly, the video card capability

problem solution page 3200 may suggest that the user purchase and install a new video card 324 that meets or exceeds the specifications of the application software 384. The user may select the link 3204 indicating that the user has finished the steps and/or finished reviewing the information to be returned to the bad or distorted picture solution page 2800. The user
5 may then remove step 5 2836 from the list of steps by selecting the "done" button 2842.

If the previous steps have been unsuccessful in solving the problem, the user may select step 6 2844, which is directed to a defective video card. By selecting the "show me fix" button 2848, the user may be presented with the video card connection problem solution page 3100, which describes procedures that the user may perform to ensure that the video
10 card 324 is properly interconnected to corresponding slots in the motherboard of the client computer 108. The user may return to the bad or distorted picture solution page 2800 by selecting the link 3108 indicating that the procedures have been completed. Step 6 2844 may be removed from the list of steps by selecting the "done" button 2850. If all of the steps have been completed, hitting a last "done" button (e.g., button 2850) will cause a problem status
15 page 5000 (see Fig. 50) to be displayed.

It should be appreciated that the user need not proceed through the various steps presented to the user in response to the selection of a particular problem in order. For example, if the user is certain that the correct video driver is being used, step 1 2808 of the bad or distorted picture solution page 2800 need not be completed, and the user can proceed
20 to step 2 2812, or any other step. Furthermore, it should be appreciated that all of the steps need not be completed, and that the user may exit a particular problem solution page at any time. For instance, if the user completes the procedures associated with step 2 2812, and the problem is solved, the user may click on the select another device/problem link 2852 to be returned to the problem selection page 2500.

25 It should also be appreciated that not all of the possible self-help steps associated with an indicated problem need to be presented to the user. For example, in accordance with an embodiment of the present invention, steps concerning items that are known to be okay, either through automated testing or comparisons, are not included in the self-help tutorial dispositions. For instance, in the example above concerning the selection by the user of a
30 problem with the monitor 352, the first step 2804 concerning an incorrect driver will not be included in the provided steps if a comparison indicates that the video driver is correct. The comparison may comprise comparing the file name and file size of the video driver detected

on the client computer to the file name and file size of the most current video driver available for the video card 324. As yet another example, steps concerning confirming that hardware is properly connected to the client computer 108 will not be included in the self-help tutorial dispositions if automatic testing confirms that such devices are properly connected.

- 5 Accordingly, it should be appreciated that the dispositions provided in accordance with the present invention are adaptive, and that the particular set of dispositions presented to a user are built dynamically, in response to the results of comparisons and testing concerning the client computer 108.

As a further example of the steps that may be taken in connection with resolving a
10 problem designated or selected by a user, the user may again select a hardware problem 2508 from the problem selection page. The user may then select the hard disk 336 as a problem device by selecting the hard drive link 2608 from the hardware problem selection page 2600 (see Fig. 26). Upon selection of the hard disk link 2608, the user is presented with a hard disk drive problem solution page 3300 (see Fig. 33).

- 15 The hard disk drive problem solution page 3300 may provide links to solutions for problems detected during testing of the client computer 108. Alternatively or in addition, links may be provided to solutions for typical hard disk drive 336 problems. For example, a first link 3304 may be directed to problems involving the retrieval of programs or data from the hard disk drive 336. In addition, a second link 3308 directed to problems involving
20 writing data to the hard disk drive 336 may be provided. According to an embodiment of the present invention, the link to problems involving retrieving programs or data 3304, and the link concerning problems writing data to disk 3308 may be provided whether or not testing of the client computer 108 has resulted in the detection of problems with the hard disk 336 (i.e. they may be provided in response to selection of the hard disk link 2608 by the user).
25 In addition, upon the selection of a particular device or program, such as the hard disk 336, additional testing may be performed automatically.

If the user selects the link directed to problems involving writing data 3308, the user is presented with a hard disk drive write problem solution page 3400 (Fig. 34). A first step 3408 may be directed to write problems caused by a hard disk 336 that is full. By selecting
30 the "show me fix" button 3412, the user is presented with a full hard disk drive problem solution page 3500 (see Fig. 35).

The full hard disk drive problem solution page 3500 is an example of a self-help tutorial disposition available from the server 104, and may describe actions that the user may take to free up space on the hard drive 336. In addition, a link 3504 may be provided to automatically initiate a program that can be used to delete unnecessary files. The deletion of unnecessary files may be semiautomated, in that files likely to be unnecessary may be presented in a list to the user. The user may then choose to delete those files by selecting them. Therefore, the full hard disk drive problem solution page 3500 is also an example of an automated fix or maintenance disposition. An example of files that are likely unnecessary is temporary Internet files maintained to speed up navigation over the Internet. The user may return to the hard disk drive write problem solution page 3400 by selecting the link 3508 to indicate that the procedures have been completed. The user may then remove step 1 3408 from the list of steps on the hard disk drive write problem solution page 3400 by selecting the done button 3414.

Step 2 3416 of the hard disk drive write problem solution page 3400 is directed to write problems due to the fragmentation of data stored on the disk drive 336. By selecting the "show me fix" button 3420, the user may be presented with a fragmented hard disk drive problem solution page 3600 (see Fig. 36). The fragmented hard disk drive problem solution page 3600 is another example of a self-help tutorial disposition provided in accordance with an embodiment of the present invention, and may provide a description of the types of problems caused by fragmented hard drives 336. In addition, a link 3604 may be provided to allow the user to automatically initiate a defragmentation utility. Therefore, a user may defragment a hard disk drive 336 simply by selecting the appropriate link (e.g., defragmentation link 3604) without needing to locate a program capable of defragmenting the hard disk drive 336. Alternatively, in response to selection of the defragmentation link 3604, a defragmentation script or utility may be downloaded from the server 104 to the client computer 108 to allow defragmentation of the disk drive 336 to be performed. Accordingly, the fragmented hard disk drive problem solution page 3600 is also an example of an automated fix or maintenance disposition. After completion of the defragmentation procedures, the user may automatically be returned to the hard disk drive write problem solution page 3400, or the user may choose to return to the hard disk drive write problem solution page 3400 by selecting the completed link 3608.

With continued reference to Fig. 34, step 3 3424 is directed to problems writing to the disk drive 336 caused by loose connector cables. By selecting the "show me fix" button 3428, the user is presented with a hard disk drive connector solution page 3700 (see Fig. 37). The hard disk drive connector solution page 3700 is still another example of a self-help tutorial disposition, and may describe the types of cables interconnected to the hard drive 336, and regarding damage to the data cable that the user should check for to determine whether such damage has caused the indicated problem. In addition, the user may be instructed to ensure that the cables are properly seated, and that there are no bent pins in the associated connectors. After the procedures have been completed, or if the user does not wish to complete the described procedures, the user may select the link 3704 indicating that the procedures have been completed to be returned to the hard disk drive write problem solutions page 3400. Upon selection of a last remaining "done" button (e.g., "done" button 3430), the user is presented with a problem status page 5000 (see Fig. 50).

As a further example, and with continued reference to Fig. 26, the user may select a link 2612 to indicate that a printer 368 has not been detected. In response to the selection of the link 2612 indicating that a printer 368 is not shown in the list of hardware, the user is presented with a printer not detected solution page 3800 (see Fig. 38). In a first step 3804, a fix directed to a printer that does print is provided. By selecting the "show me fix" button 3808, the user is presented with a printer CMOS entry problem solution page 3900 (see Figs. 39A-C).

The printer CMOS entry problem solution page 3900 is another example of a self-help tutorial disposition, and describes the steps that the user must take in order to verify that the CMOS entry for the printer is properly configured. In addition, illustrations or screen shots 3904 of a utility commonly used in connection with the setting of CMOS entries may be provided. In addition, illustrations 3908 of different port types may be provided to assist the user in determining what type of port the printer 368 is connected to. After the procedures set forth in the CMOS entry problem solution page 3900, or if the user for any reason wishes to exit that page, the user is again presented with the printer not detected solution page 3800 following selection of the "completed" link 3912. Step 1 may be removed from the printer not detected solution page 3800 by selecting the corresponding the corresponding "done" button 3810.

With reference again to Fig. 38, step 2 3812 is directed to a printer 368 that is not listed in the program's folder of the operating software 380. By selecting the "show me fix" button 3816, the user is presented with a printer connection problem solution page 4000 (see Figs. 40A-D). The printer connection problem solution page 4000 is still another example of a self-help tutorial disposition, and may include information regarding the connections that are required for proper printer operation. Photographs 4004 may be included to assist the user in identifying relevant connectors. When the indicated procedures have been completed, or when the user wishes to exit the page, the user may select a link 4008 to return to the printer not detected solution page 3800. A problem status page 5000 (see Fig. 50) is presented if the user then selects the "done" button 3818 associated with step 2 3812.

As yet another example, a user who indicates that a problem involving software is being experienced is presented with a software problem selection page 4100 (see Fig. 41). The software problem selection page 4100 includes several descriptions of particular types of software problems. For example, the user may select from "my program gives me an error message before the program shows on my screen" 4104; "my program starts but when I try to use it I get an error message" 4108; "my program runs but it does not perform correctly when used" 4112; "I get blue screens and error messages when starting some programs" 4116; and "my computer runs slowly during most operations" 4120. Accordingly, the present invention allows a user to describe a problem that is being experienced in non-technical language.

In response to a selection of the description "my program gives me an error message before the program shows on my page" 4104, the user is presented with a software error disposition page 4200 (see Fig. 42). The software error disposition page 4200 provides suggested solutions to the indicated problem. In particular, the page 4200 may suggest that the user run a utility program, such as scan disk, to repair corrupt files. In addition, a "show me fix" 4204 button is provided. By selecting the "show me fix" 4204 button, the user can access further information regarding the suggested repair. For example, the user may be presented with a scan disk information page 4300 (see Fig. 43) that describes the scan disk process. The scan disk information page 4300 may also include a run or next button 4304 that allows the user to initiate execution of the scan disk program. Accordingly, the present invention provides a mechanism by which the user can be informed of suggested maintenance or repair procedures, and allows the user to initiate those procedures from the

client application 400, without requiring that the user have advanced technical skills. After the scan disk utility has executed, the user may again select the next button 4304 to proceed to the next test sequence page. The user is then returned to the software error disposition screen 4200, and the user may select the “done” button 4208 to indicate that the previous step
5 has been completed.

The user may then be presented with a software error, defragmentation disposition screen 4400 (see Fig. 44). The defragmentation disposition screen 4400 includes a “show me fix” button 4404 that can be selected by the user to view the step by step procedure for running the defragmentation program. Upon selection of the “show me fix” button 4404, the
10 user is presented with a defragmentation information screen 4500 (see Fig. 45). The defragmentation information page 4500 includes a “next” button 4504 that allows the user to select execution of the defragmentation program. Following completion of the defragmentation program operations, the user is returned to the software error, defragmentation disposition screen 4400. Upon selection of the “done” button 4408, the user
15 is presented with software error, check for error message disposition screen 4600 (see Fig. 46).

The software error, check for error message disposition page 4600 includes a “show me fix” button 4604 that takes the user to a check program error information page 4700 (see Fig. 47). The check program error information page 4700 describes the steps that will occur
20 automatically and the steps that the user must take after the clicking the “next” button 4704 to proceed with the check. In particular, the client may be instructed to double click on the start-up icon associated with the software that the user believes is problematic.

With reference now to Fig. 48, a found error message page 4800 is illustrated. The found error message page 4800 presents to the user the particular error message generated
25 by the program started by the user, and recommends further action. For example, the user may be told to uninstall and then reinstall the program if program disks are available. A “done” button 4804 is provided to allow the user to exit the error message found page 4800 when the user is finished reading the information on that page.

Following selection of the “done” button 4804, the user is presented with an uninstall
30 program information page 4900 (see Fig. 49). From the uninstall program information page 4900, the user can choose to select a “show me fix” 4904 to receive instructions on how to uninstall the program. The user may then be presented with a list of programs to select from.

By selecting the problematic program and indicating a desire to proceed by clicking on a provided button, the user may initiate the uninstall process. When the uninstall process has completed, the user may select the "done" button 4908.

5 A problem status page 5000 (see Fig. 50) is presented to the user after all of the procedures associated with an indicated problem have been completed. The problem status page 5000 allows the user to select to receive a session summary, and provides various additional sources of assistance for use if the procedures followed have not resulted in resolution of the indicated problem or problems. For example, the user may select a chat link 5004 to commence a chat session with a live service technician. In addition, a telephone
10 number 5008 may be provided to allow the user to speak with a service technician by telephone. In addition, an e-mail address 5012 may be provided to allow the user to correspond with service technicians by e-mail. A "next" button 5016 presents the user with a summary report 5100 (see Figs. 51A-B).

The summary report 5100 provides a list 5104 of each device detected in connection
15 with the client computer 108. For each such device, the results of automated testing 5108 are presented in a passed/failed format. With respect to devices that the user indicated were problematic, the symptom identified by the user 5112 is presented. Accordingly, the summary report 5100 provides the status of devices associated with the client computer 108, including the results of testing and symptoms that were being experienced by the user. In
20 addition, a record of maintenance procedures or fixes performed 5114 may be included.

With respect to all or certain of the devices included in the list 5104, links 5116 may be provided for accessing additional sources of support. For example, the links 5116 may open a browser window on the client computer 108 addressed to a support web site maintained by the manufacturer of the device associated with the link 5116. Alternatively
25 or in addition, the additional support link 5116 may provide other means for contacting sources of additional support, such as telephone numbers or e-mail addresses for contacts at the manufacturer of the device associated with the link 5116.

Other links may be provided on the summary report page 5100 that are directed to the future performance of the client computer 108. For example, a potential issues link 5120
30 may be provided to alert the user to potential future issues with respect to the client computer 108. Accordingly, selecting the potential issues link 5120 may direct the user to a potential issues page 5200 (see Fig. 52) summarizing the condition of various aspects of the client

computer 108. The maintenance link 5124 may be selected to allow the user to access tutorials or perform various maintenance procedures. Accordingly, the present invention may provide facilities that allow even a user who is not technically skilled to perform maintenance procedures, thereby potentially avoiding future problems with the client computer. Examples
5 of maintenance procedures that may be accessed through the maintenance link 5124 and in turn the maintenance issues page 5300 (see Fig. 53) include deleting unwanted files, running scan disk, running defragmentation utilities, and installing and updating virus protection software. The product links and services link 5128 presents the user with a service and upgrade options page 5400 (see Fig. 54). From the service and upgrade option page 5400,
10 the user can link to providers of various products, including virus protection software, computer security products, software, hardware suppliers, and computer tutorials.

In accordance with the present invention, a method and apparatus for diagnosing computer hardware and software are provided. The invention in its broader aspects relates to a method and apparatus for diagnosing computer hardware and software without requiring
15 input from a user or technician who is experienced in computer repair. In particular, the present invention provides a method and apparatus that are capable of diagnosing computer hardware and software while receiving only basic input from a user of a computer to be diagnosed, and without requiring human intervention at the server side of the system. Furthermore, the method and apparatus of the present invention is capable of providing repair
20 information, including information necessary to effect a repair automatically.

Although the present invention includes descriptions of particular embodiments, it will be appreciated that various modifications are possible and are within the scope of the description. For example, menu items that may be selected by the user to describe a perceived problem or problems may include items in addition or as alternatives to those
25 described in the foregoing description. As a further example, the computer to be diagnosed may be part of a local computer network, rather than a stand alone computer. Furthermore, the present invention may be used to diagnose digital devices other than personal computers, including personal digital assistants, wireless devices of various configurations, or other devices capable of communicating with a diagnosing server.

30 The foregoing discussion of the invention has been presented for purposes of illustration and description. Further, the description is not intended to limit the invention to the form disclosed herein. Consequently, variations and modifications commensurate with

the above teachings, within the skill and knowledge of the relevant art, are within the scope of the present invention. The embodiments described hereinabove are further intended to explain the best mode presently known of practicing the invention and to enable others skilled in the art to utilize the invention in such or in other embodiments and with various
5 modifications required by the particular application or use of the invention. It is intended that the appended claims be construed to include alternative embodiments to the extent permitted by the prior art.

What is claimed is:

1. A method for remotely diagnosing a computer, comprising:
establishing communication between a server and a communications interface associated with a client computer;
5 establishing communication between a client application operating on said client computer and said server;
in response to a signal associated with said communications interface and received by said server, downloading a first diagnostic tool from said server to said client application;
executing said first diagnostic tool;
10 returning a result from said client application to said server; and
returning a disposition from said server to said communications interface.
2. The method of Claim 1, wherein said communications interface includes a browser and the method further comprising:
downloading a client identifier from said server to said browser;
15 placing said identifier in a title bar of a browser window;
passing said identifier to said client application, wherein said client application copies said identifier from said browser window.
3. The method of Claim 1, further comprising:
establishing a user record in a database associated with said server corresponding to
20 said client computer, wherein said record includes a status field;
in response to a signal received from said communications interface, setting said status field to a first value;
executing a second diagnostic tool using said client application in response to said client application detecting said first value in said user record.
- 25 4. The method of Claim 3, further comprising:
in response to a signal received from said client application, setting said status field to a second value after said step of executing a said second diagnostic tool is essentially complete;
displaying a next page in response to said communications interface detecting said
30 second value in said user record.
5. The method of Claim 3, wherein said client application polls said server to detect said first value.

6. The method of Claim 4, wherein said communications interface polls said server to detect said second value.

7. The method of Claim 1, further comprising:
using said communications interface, prompting a user to select a potential computer
5 problem;

in response to said user's input, downloading and executing a second diagnostic tool using said client application;

returning a result of executing said second diagnostic tool to said server; and

displaying a disposition to said user using said communications interface.

10 8. The method of Claim 7, wherein said server compares said result of executing said second diagnostic tool to a plurality of stored results, wherein each of said stored results is associated with one of a plurality of dispositions, and wherein said server returns at least a first disposition of said plurality of dispositions to said communications interface.

9. The method of Claim 7, wherein said second diagnostic tool traps an error
15 message generated on said client computer, and wherein said step of returning a result to said server comprises returning said trapped error message to said server.

10. The method of Claim 1, further comprising:
in response to a signal from said communications interface and received by said server, downloading a second client diagnostic tool from said server to said client
20 application;

executing said second client diagnostic tool; and

returning a result from said client application to said server.

11. The method of Claim 1, wherein said disposition comprises information concerning at least one of a list of installed hardware, a list of installed software, a hardware
25 fault, a software fault, a recommendation to perform a maintenance procedure and a source for obtaining further information.

12. The method of Claim 1, further comprising:
providing at least a partial inventory of devices installed on said client computer to a user; and
30 prompting the user of said client computer to identify one or more additional installed devices.

13. The method of Claim 1, further comprising:

storing at least a partial inventory of devices installed on said client computer in a database associated with said server.

14. A system for remotely diagnosing computer hardware and software,
5 comprising:

a server;

a server application program;

a client computer;

a plurality of client diagnostic tools;

10 a computer network interconnecting said server and said client computer;

a communications interface in communication with said server;

a client application program, wherein said client application program communicates with said server and said client application performs a number of functions, including:

15 executing at least a one of said plurality of client diagnostic tools, said at least one of said client diagnostic tools being downloaded from said server; and

returning results obtained from said executing step to said server, wherein in response to said results returned to said server, said server application program returns a disposition concerning said client computer to said communications interface.

15. The system of Claim 14, wherein said computer network comprises the
20 Internet.

16. The system of Claim 14, wherein a first of said client diagnostic tools creates a first inventory of hardware and software installed on said client computer.

17. The system of Claim 16, wherein said first inventory is returned to said communications interface.

25 18. The system of Claim 14, wherein said disposition concerning said client computer comprises at least one of a suggested maintenance operation, a suggested repair, a detected fault and a referral to an additional source of repair information.

19. The system of Claim 18, wherein said referral to an additional source of repair information comprises providing at least one of a telephone number, a mailing address, an
30 e-mail address and a Universal Resource Locator.

20. A method for providing a user of a computer with diagnosis of said computer from a remote location, comprising:

establishing a communications channel between a communications interface associated with said computer and a server located at said remote location;

5 in response to said server receiving a first signal from said communications interface, downloading a client application to said computer;

installing said client application on said computer;

in response to said server receiving a second signal from said communications interface, downloading a first diagnostic tool to said computer;

10 executing said first diagnostic tool using said client application, wherein at least a partial inventory of hardware associated with said computer is obtained;

returning said at least partial inventory of said hardware from said client application to said server;

downloading a second diagnostic tool to said computer;

15 executing said second diagnostic tool using said client application, wherein at least a first functional test of at least a portion of said installed hardware is performed;

returning a first result from said first functional test to said server;

analyzing said first result; and

returning a disposition of said computer to said user.

20 21. The method of Claim 20, wherein said step of analyzing said first result comprises comparing said first result to a plurality of stored results having an associated disposition.

22. The method of Claim 20, further comprising:

downloading a third diagnostic tool to said computer;

25 executing said third diagnostic tool using said client application, wherein an application resident in said computer is opened, and wherein information concerning the opening of said resident application is returned to said server.

30 23. The method of Claim 22, wherein said information comprises at least one of a time to load said resident application, an error message, and a time to exit said resident application.

24. The method of Claim 20, further comprising:

assigning an identifier to said computer;

downloading said identifier from said server to said communications interface;

placing said identifier in a title bar of a window on said computer; and

5 copying said identifier from said title bar to said client application.

25. The method of Claim 20, wherein said step of executing said first diagnostic tool is initiated in response to said client application detecting a first value in a user record stored on said server, wherein said first value is entered in said user record in response to a signal received from said communications interface.

10 26. The method of Claim 25, wherein following said step of executing said first diagnostic tool a second value is entered in said user record, and wherein in response to said communications interface detecting said second value a next page is displayed.

27. A method for remotely diagnosing a computer, comprising:

15 providing computer related selector inputs on a display screen including a plurality of the following: a hardware related selector input, a software related selector input, a performance related selector input and an other related selector input;

performing a plurality of the following using the computer: checking at least partially inventory of hardware devices associated with the computer, conducting functional tests associated with a number of said hardware devices, determining performance data associated with the computer, diagnosing software associated with the computer, relying on at least one of said selector inputs, and utilizing log files from test applications associated with the computer to generate diagnostic information related to said hardware devices and/or said software associated with the computer; and

developing output information based on said diagnostic information.

25 28. A method, as claimed in Claim 27, wherein:

said providing step includes selecting said software related selector input and generating a first menu related to diagnosing software.

29. A method, as claimed in Claim 27, wherein:

30 said providing step includes selecting said performance data selector input and generating a second menu related to diagnosing performance of the computer.

30. A method, as claimed in Claim 27, wherein:

said performing step includes checking at least partially said inventory of said hardware devices, conducting said functional tests associated with said at least partial inventory of said hardware devices and ascertaining whether at least one of said selector
5 inputs was activated by a user of the computer.

31. A method, as claimed in Claim 27, wherein:

said output information relates to at least one of the following: assisting a user of the computer to change the computer, providing a change by said server to the computer and providing a source that can have information related to making a change to the computer.

10 32. A method, as claimed in Claim 31 wherein:

said output information includes at least one of the following: web site link information, telephone link information, customer help line link information, telephone support link information and a software patch.

33. A method, as claimed in Claim 27, further comprising:

15 assigning an identifier to the computer;
providing said identifier to a communications interface associated with the computer;
and

providing said identifier to a client application that is executable using the computer.

34. A method, as claimed in Claim 33, wherein:

20 said communications interface includes a client browser and said providing step includes placing said identifier in a title bar of said client browser and reading said title bar using said client application.

35. A system for remotely diagnosing a computer, comprising:

a server; and

25 storage memory communicating with said server that stores a plurality of the following: a first diagnostic tool related to checking inventory of hardware devices associated with the computer; a second diagnostic tool related to performing functional tests on hardware devices associated with the computer; a third diagnostic tool related to determining performance data associated with the operation of the computer; a fourth diagnostic tool
30 related to diagnosing software associated with the computer; and/or files from test applications associated with the computer.

36. A system, as claimed in Claim 35, wherein:

said storage memory stores a client application that can execute on the computer and also stores a sixth diagnostic tool related to utilizing selector inputs.

37. A method, as claimed in Claim 36, wherein:

5 a client application is downloadable to the computer from said server and said client application is used in obtaining information when at least one of said selector inputs is activated by a user of the computer and information related to said at least one selector input when activated is provided to said server.

38. A system, as claimed in Claim 37, further comprising:

10 a first computer that executes said client application and is used to display said selector inputs.

39. A method for diagnosing a computer, comprising:

directing a communications interface application to a diagnosing web site;

providing identifying information related to a computer to be diagnosed;

15 receiving at said computer to be diagnosed a client application;

receiving test results of hardware installed in said computer to be diagnosed;

selecting a problem to diagnose; and

receiving information regarding said problem, wherein said information includes at least one of a suggested automated fix and a suggested self-help procedure.

20 40. The method of Claim 39, further comprising executing said client application, wherein said client application is executed independently of said communications interface application

41. The method of Claim 39, further comprising:

receiving at said computer to be diagnosed at least a first script; and

25 running said at least a first script;

42. The method of Claim 41, wherein said at least a first script comprises a diagnostic program.

43. The method of Claim 41, wherein said step of running said at least a first script comprises running said first script in connection with said client application.

30 44. The method of Claim 39, wherein said communications interface application is running on said computer to be diagnosed.

45. The method of Claim 39, wherein said communications interface application comprises an Internet browser.

46. The method of Claim 39, further comprising providing user identifying information.

5 47. The method of Claim 39, further comprising receiving a script to execute a utility program, wherein in response to receiving information comprising a suggested automated fix, said suggested automated fix can be performed by executing said script to execute a utility program.

10 48. The method of Claim 39, wherein a suggested self-help procedure is received, said suggested self-help procedure comprising a tutorial explaining how to perform said procedure.

49. A method for diagnosing a computer, comprising:
receiving from a remote computer identifying information;
assigning an identifier to said remote computer;
15 providing a client application to said remote computer;
executing said client application, wherein an inventory of hardware installed in said remote computer is compiled;
returning a disposition to said remote computer, wherein said disposition comprises at least one of a suggested automated fix, a suggested self-help procedure, and a suggested
20 maintenance procedure.

50. The method of Claim 49, wherein said step of executing said client application is performed independently of a communications interface application.

51. The method of Claim 49, further comprising providing at least a first test script to said remote computer, wherein said step of running said client application comprises
25 running said test script.

52. The method of Claim 49, further comprising:
providing at least a first test script to said remote computer; and
diagnosing a problem, wherein said step of diagnosing a problem comprises running said at least a first test script.

53. The method of Claim 49, further comprising:
receiving at said remote computer a selection of a problem identified by a user; and
diagnosing said problem, wherein said step of diagnosing a problem is performed in
response to said selection.

5 54. The method of Claim 49, further comprising:
providing at least a first test script to said remote computer;
executing said test script, wherein at least a first problem is identified in connection
with said remote computer; and
diagnosing said identified problem.

10 55. The method of Claim 49, wherein an inventory of software installed in said
remote computer is compiled.

56. The method of Claim 49, further comprising providing said remote computer
with a script for performing a suggested automated fix.

15 57. The method of Claim 49, further comprising performing said suggested
automated fix in response to receiving at said remote computer a signal to perform said
suggested automated fix.

58. The method of Claim 49, further comprising:
diagnosing at least one of an identified and a selected problem; and
re-diagnosing said problem after said step of returning a disposition.

20

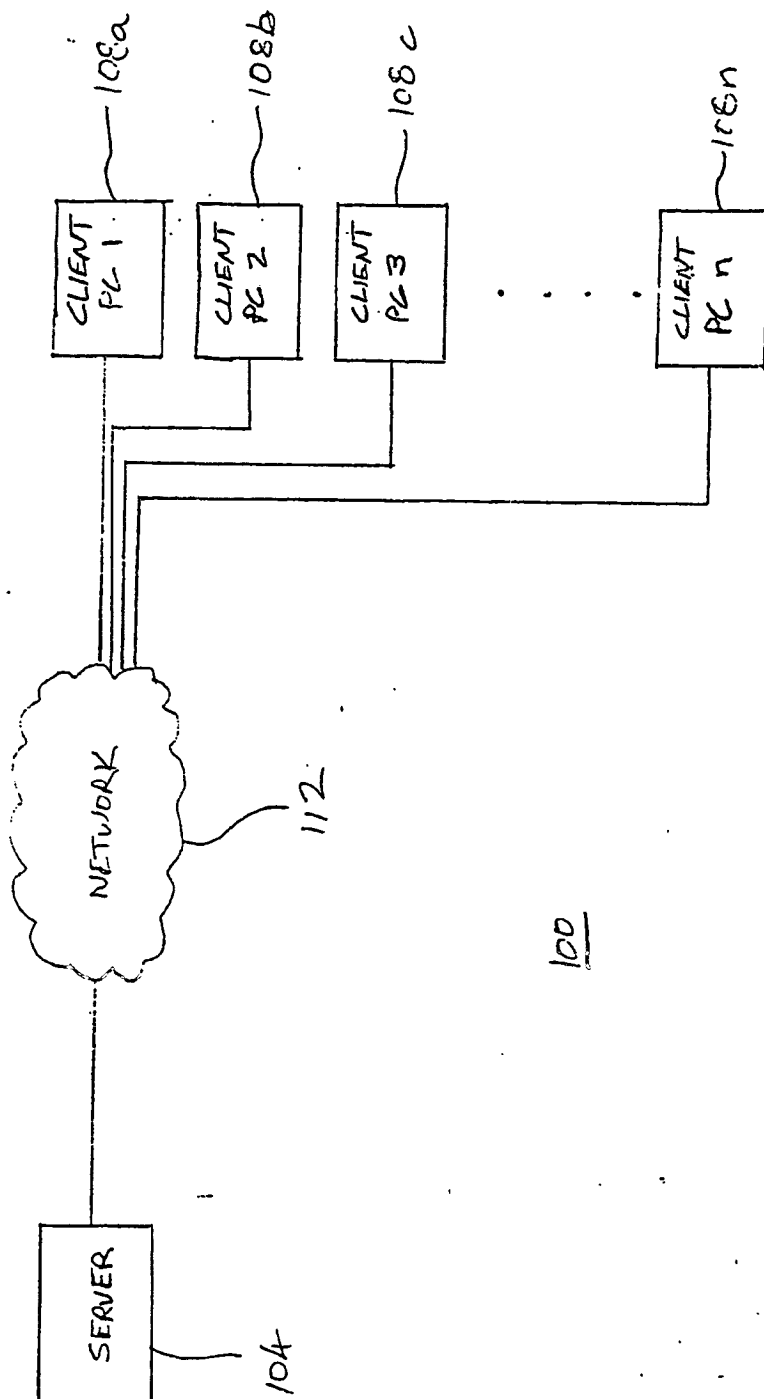
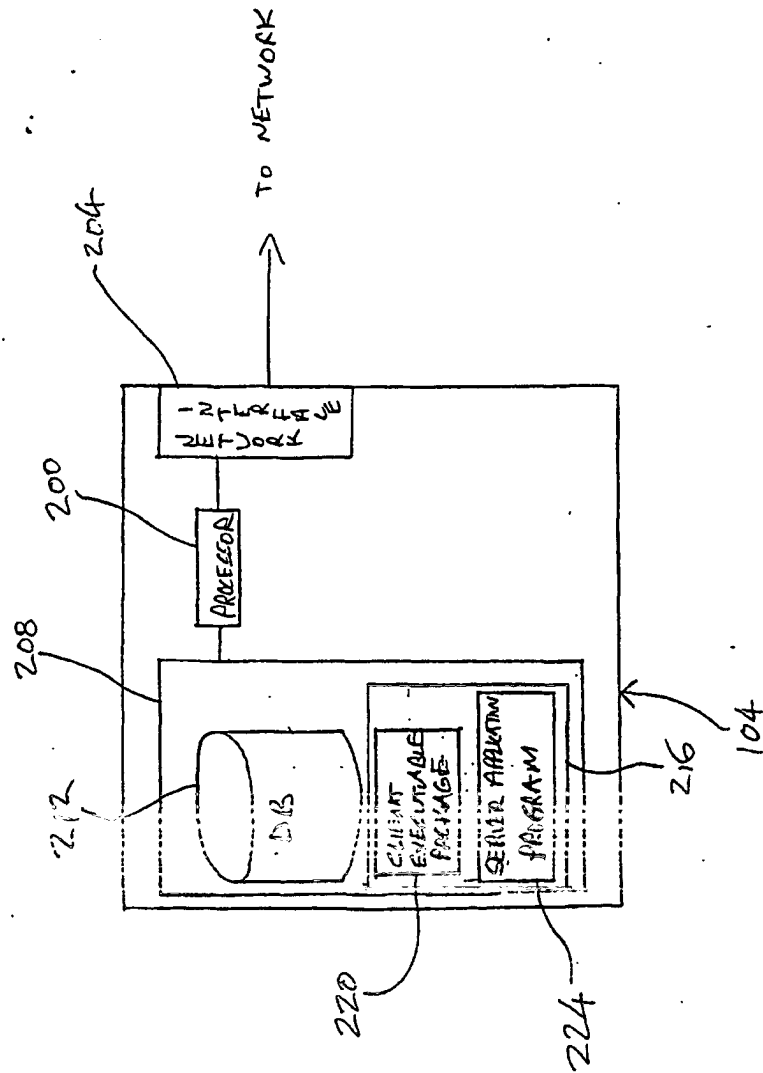


Fig. 1



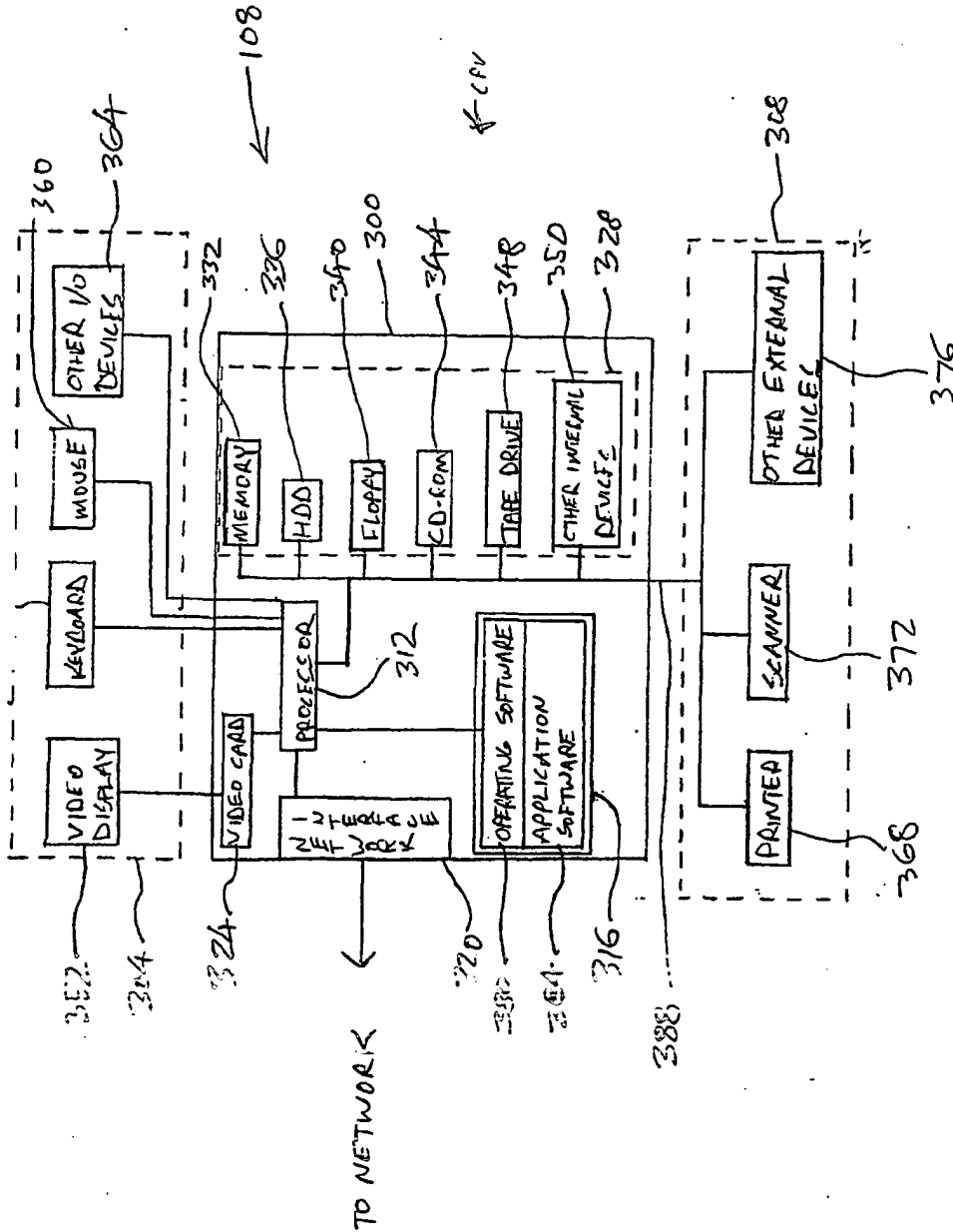


Fig. 3

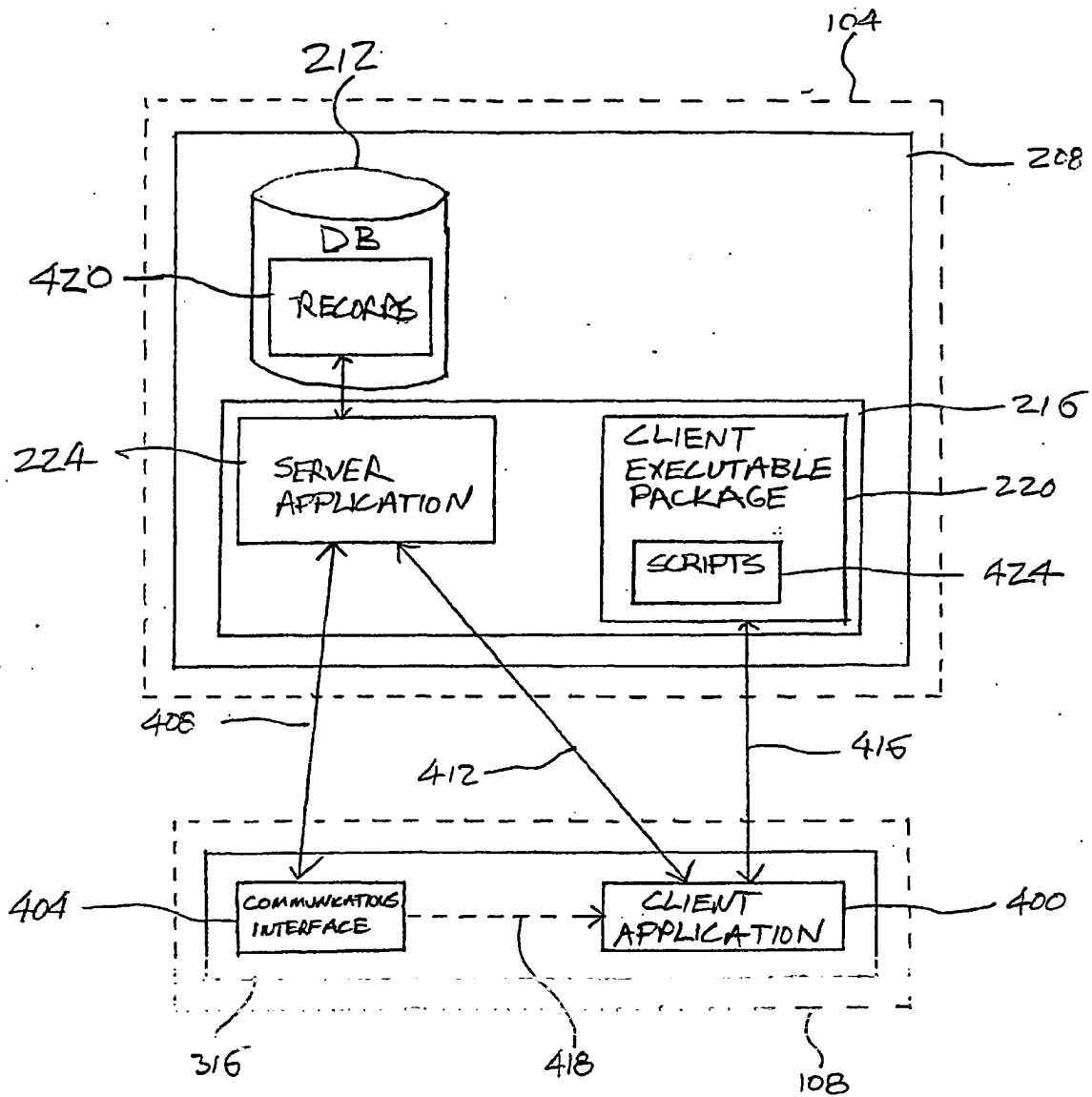


Fig. 4

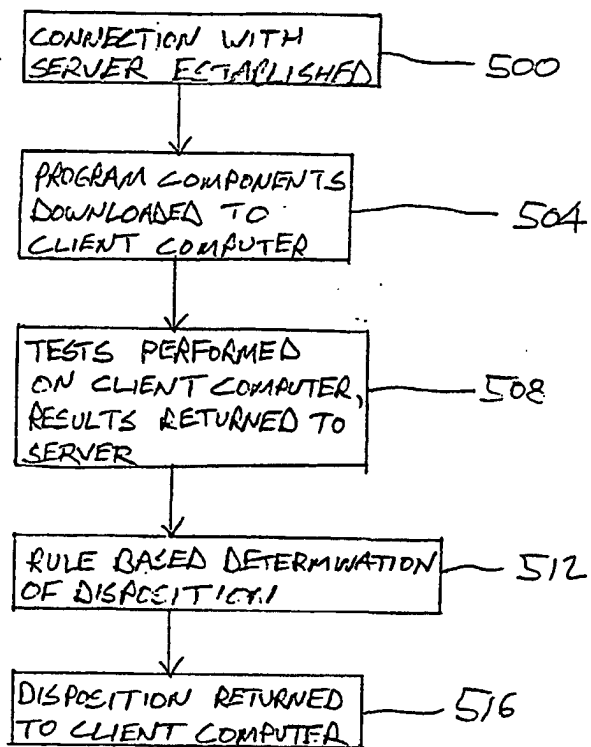


Fig. 5

CLIENT STATES

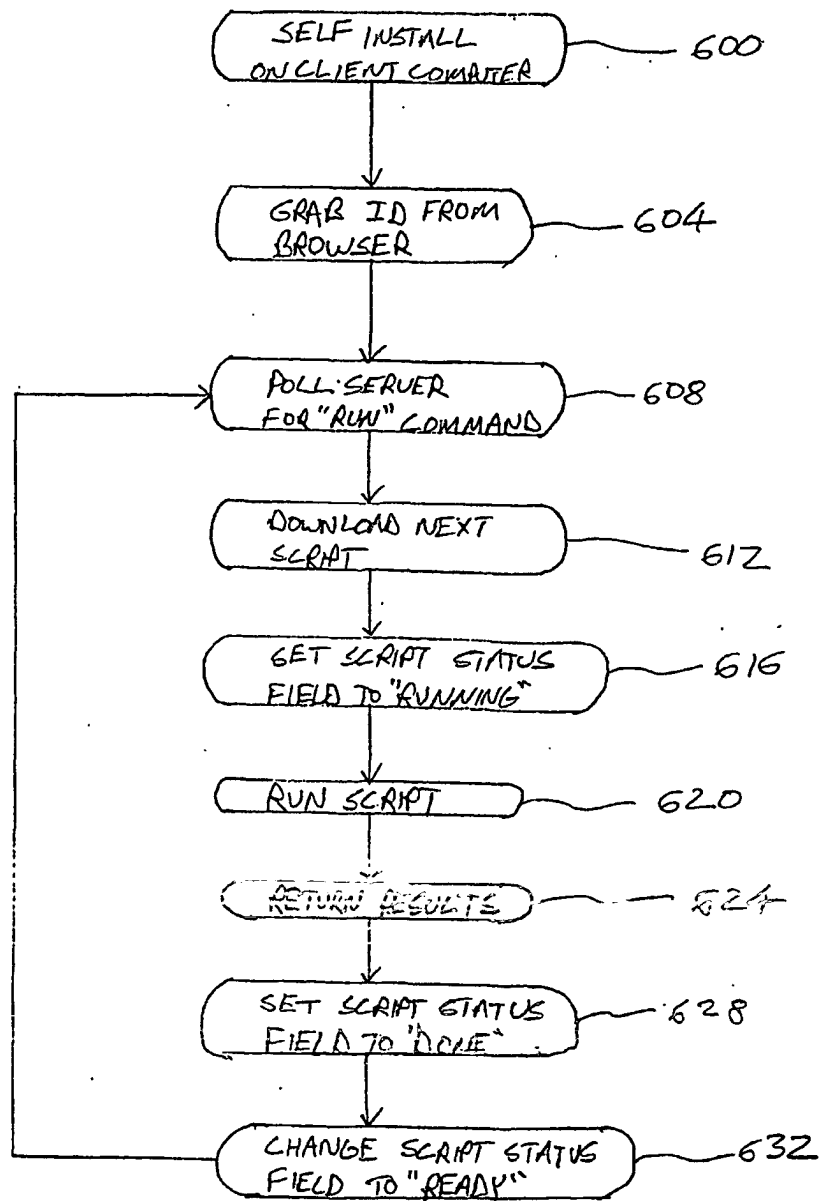


Fig. 6

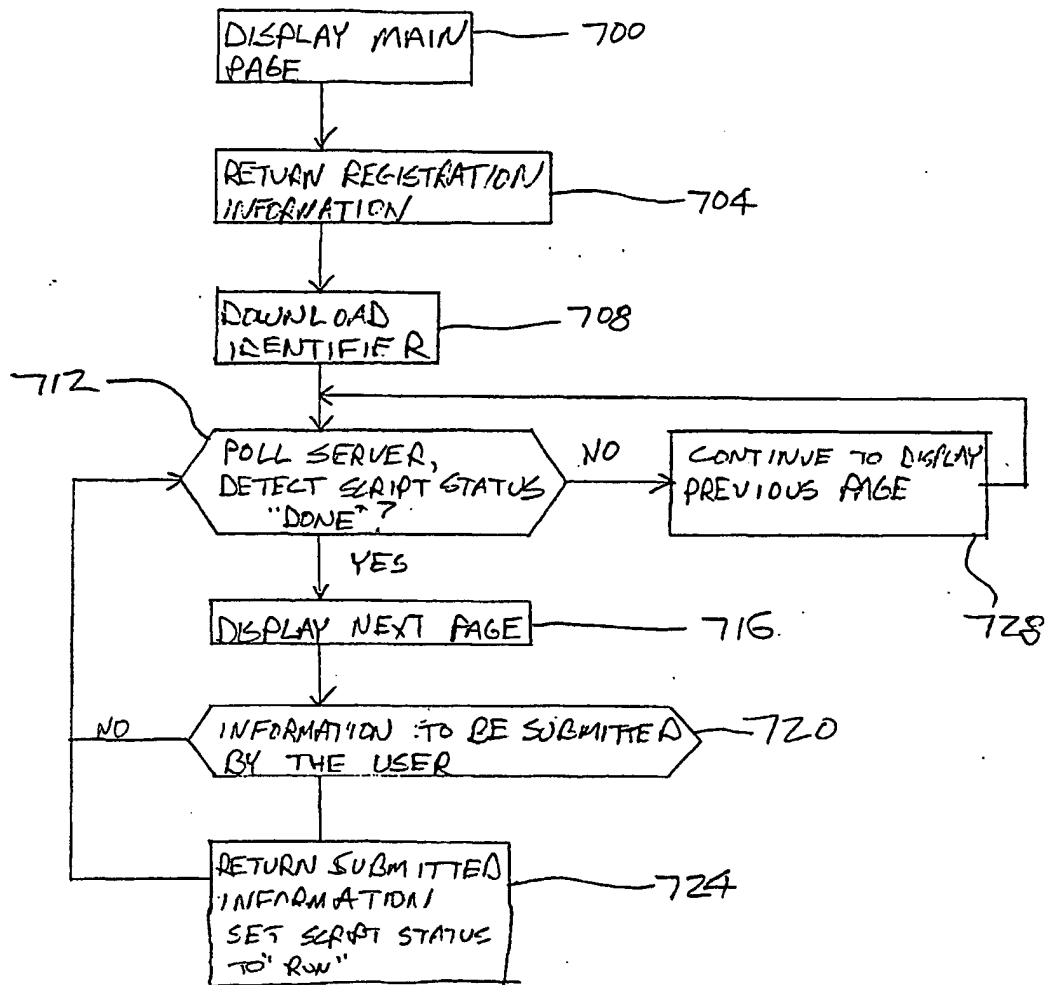


Fig. 7

TESTS

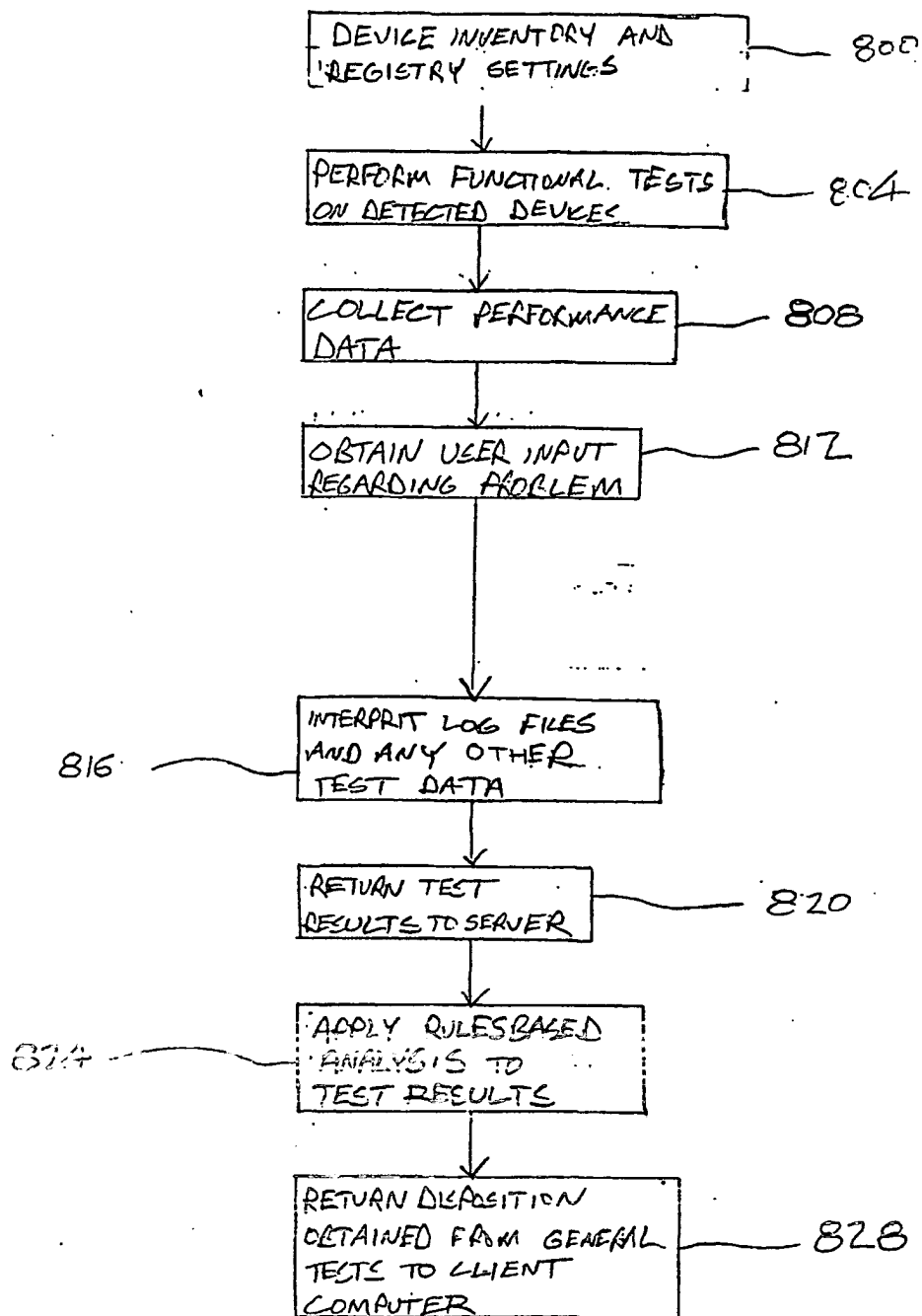


Fig. 8

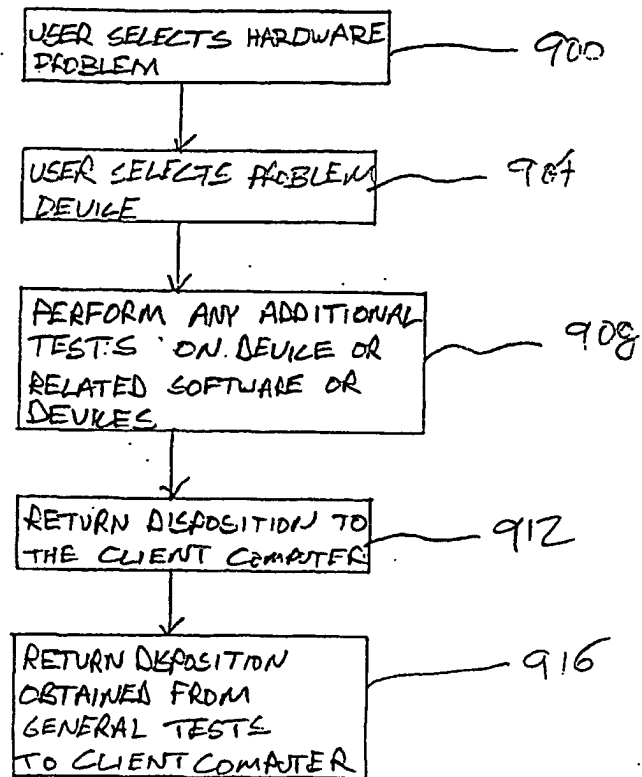


Fig. 9

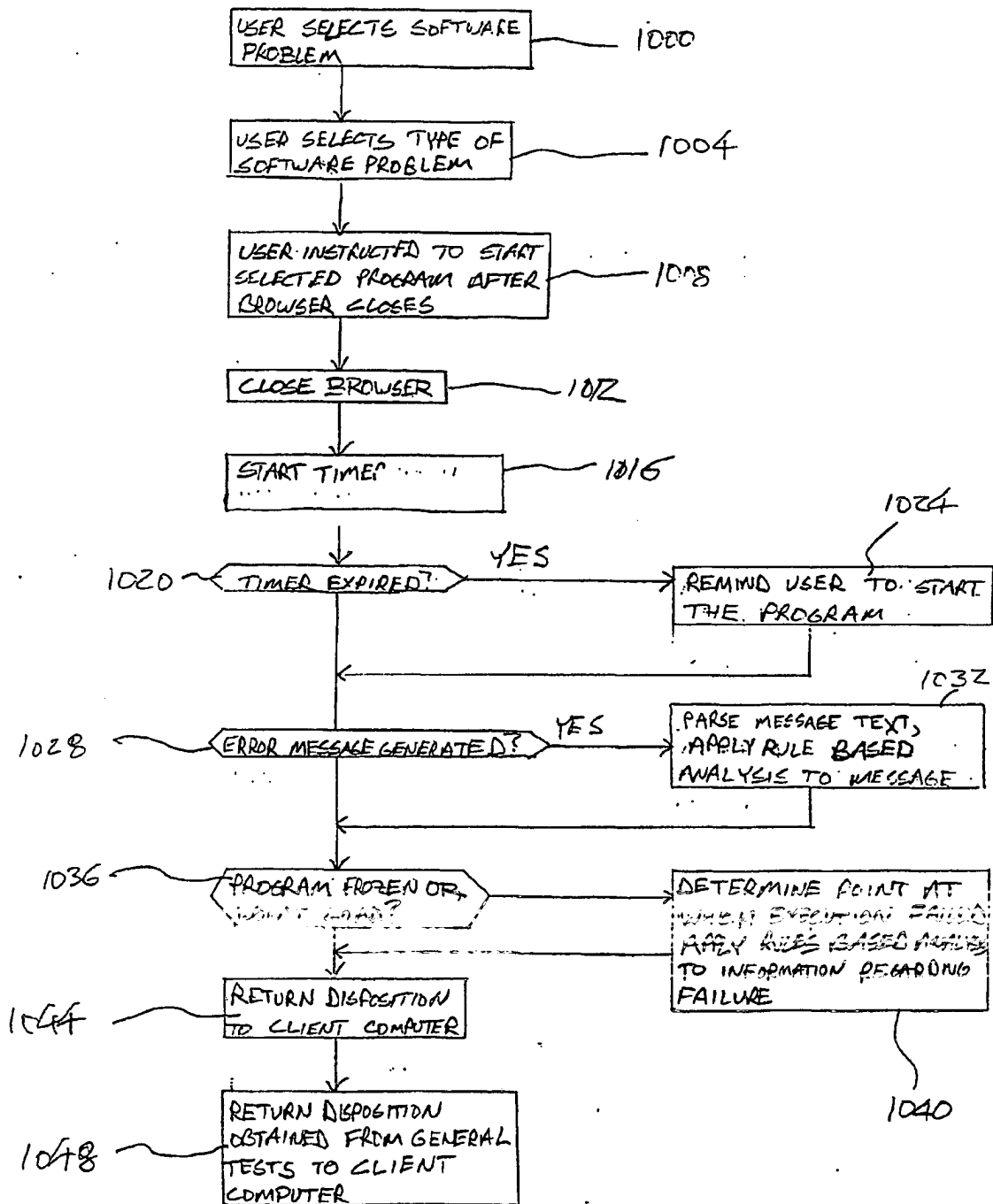


Fig. 10

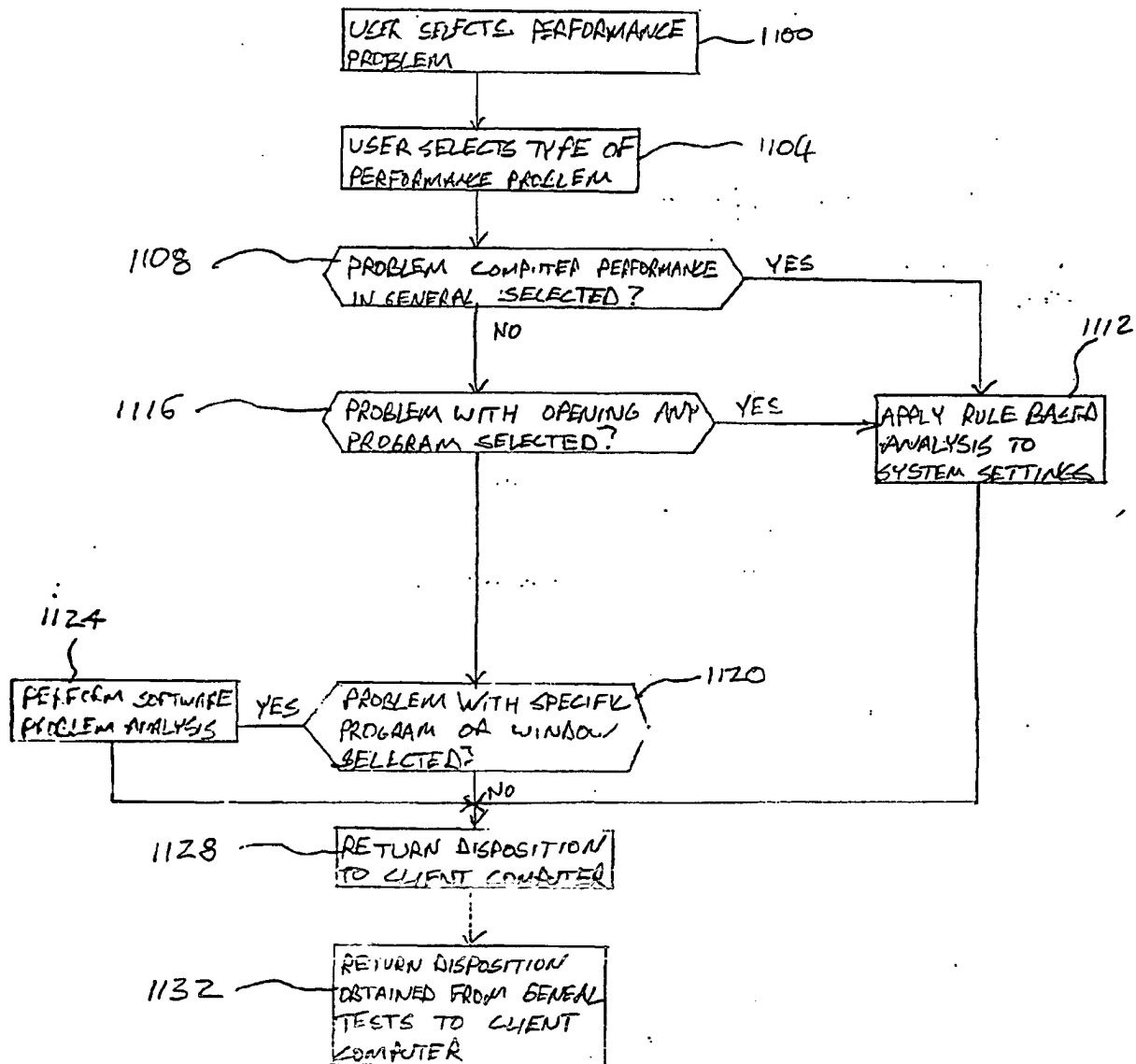


Fig. 11

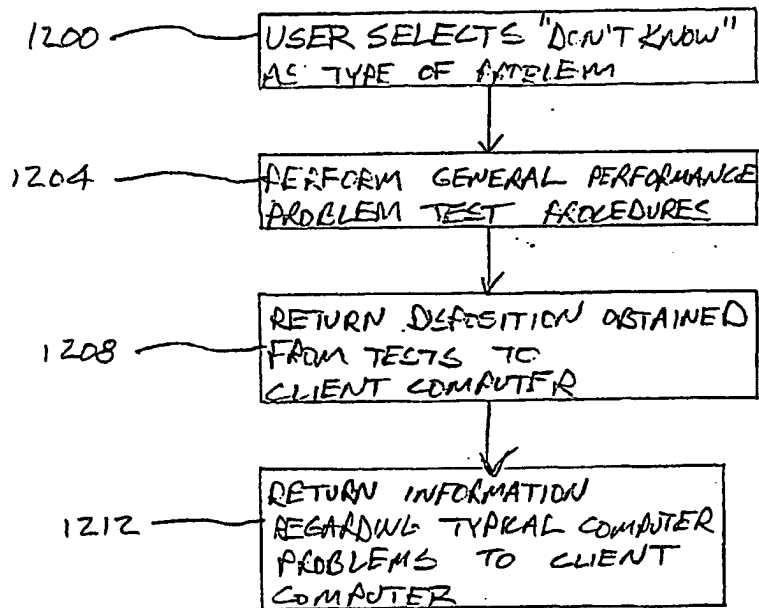


Fig. 12

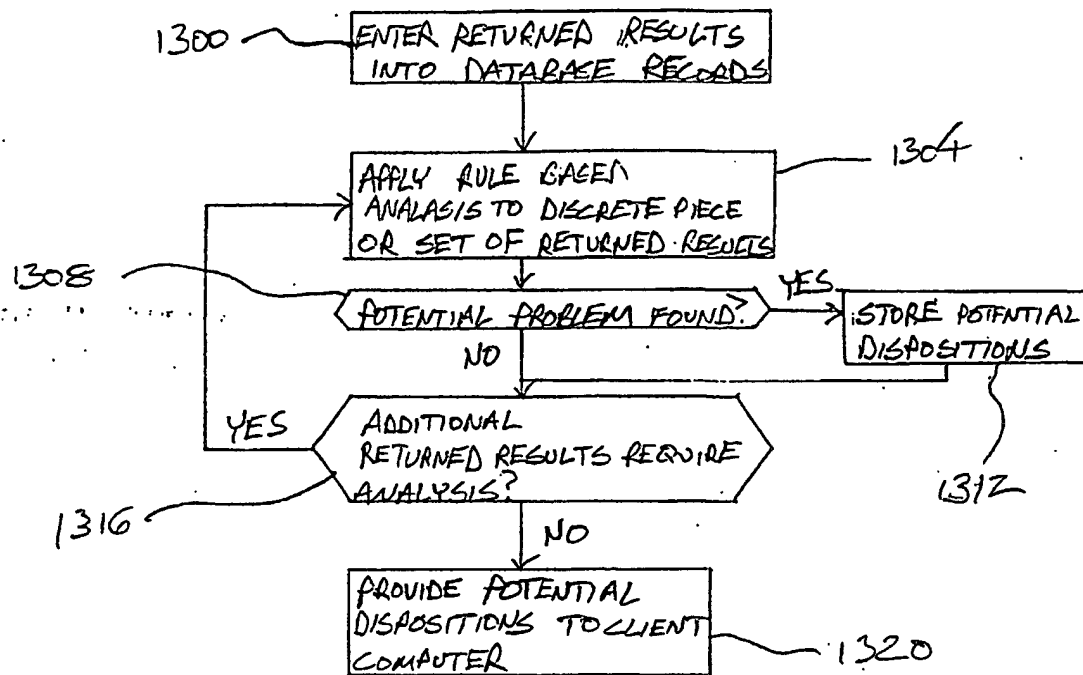


Fig. 13

NOTE: DISPOSITIONS WHERE DEVICE TYPES ARE SEPARATED OUT MAY HAVE THE SAME DISPOSITION FOR EACH TYPE OF DEVICE THE SEPARATION IS FOR THOSE DISPOSITIONS WHICH MUST BE DIFFERENT. DECISIONS ARE PENDING ON THESE DISTINCTIONS.

Select from the following links to view HTML Dispositions:

CD/DVD / Rom

- | IDE | SCSI | USB | FIREWIRE |
|--|--|--|--|
| <ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ CMOSDisabled.html ◦ DriverCorruptMissing.html ◦ PowerDataCables.html ◦ IRQConflict.html • CantReadData <ul style="list-style-type: none"> ◦ NoMedia.html ◦ badcableorfile.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ WrongMedia.html ◦ PowerDataCables.html | <ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ CMOSDisabled.html ◦ DriverCorruptMissing.html ◦ PowerDataCables.html ◦ IRQConflict.html • CantReadData <ul style="list-style-type: none"> ◦ NoMedia.html ◦ badcableorfile.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ WrongMedia.html ◦ PowerDataCables.html | <ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ CMOSDisabled.html ◦ DriverCorruptMissing.html ◦ PowerDataCables.html ◦ IRQConflict.html • CantReadData <ul style="list-style-type: none"> ◦ NoMedia.html ◦ badcableorfile.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ WrongMedia.html ◦ PowerDataCables.html | <ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ CMOSDisabled.html ◦ DriverCorruptMissing.html ◦ PowerDataCables.html ◦ IRQConflict.html • CantReadData <ul style="list-style-type: none"> ◦ NoMedia.html ◦ badcableorfile.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ WrongMedia.html ◦ PowerDataCables.html |

Floppy Disk

- | STANDARD | SCSI | FIREWIRE | OTHER |
|--|--|--|--|
| <ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ CMOSDisabled.html ◦ PowerDataCables.html • CantReadData <ul style="list-style-type: none"> ◦ NoMedia.html ◦ Virus.html ◦ MediaDefect.html ◦ PowerDataCables.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ Defragment.html ◦ MediaDefect.html | <ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ CMOSDisabled.html ◦ PowerDataCables.html • CantReadData <ul style="list-style-type: none"> ◦ NoMedia.html ◦ Virus.html ◦ MediaDefect.html ◦ PowerDataCables.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ Defragment.html ◦ MediaDefect.html | <ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ CMOSDisabled.html ◦ PowerDataCables.html • CantReadData <ul style="list-style-type: none"> ◦ NoMedia.html ◦ Virus.html ◦ MediaDefect.html ◦ PowerDataCables.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ Defragment.html ◦ MediaDefect.html | <ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ CMOSDisabled.html ◦ PowerDataCables.html • CantReadData <ul style="list-style-type: none"> ◦ NoMedia.html ◦ Virus.html ◦ MediaDefect.html ◦ PowerDataCables.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ Defragment.html ◦ MediaDefect.html |

Fig. 14-A

Hard Disk

IDE	SCSI	USB	FIREWIRE
<ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ CMOSDisabled.html ◦ Virus.html ◦ PowerDataCables.html ◦ IRQConflict.html ◦ Partition.html • CantReadData <ul style="list-style-type: none"> ◦ MediaDefect.html ◦ Virus.html ◦ PowerDataCables.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ Defragment.html ◦ PowerDataCables.html 	<ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ CMOSDisabled.html ◦ Virus.html ◦ PowerDataCables.html ◦ IRQConflict.html ◦ Partition.html • CantReadData <ul style="list-style-type: none"> ◦ MediaDefect.html ◦ Virus.html ◦ PowerDataCables.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ Defragment.html ◦ PowerDataCables.html 	<ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ CMOSDisabled.html ◦ Virus.html ◦ PowerDataCables.html ◦ IRQConflict.html ◦ Partition.html • CantReadData <ul style="list-style-type: none"> ◦ MediaDefect.html ◦ Virus.html ◦ PowerDataCables.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ Defragment.html ◦ PowerDataCables.html 	<ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ CMOSDisabled.html ◦ Virus.html ◦ PowerDataCables.html ◦ IRQConflict.html ◦ Partition.html • CantReadData <ul style="list-style-type: none"> ◦ MediaDefect.html ◦ Virus.html ◦ PowerDataCables.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ Defragment.html ◦ PowerDataCables.html

REMOVABLE

IDE	SCSI	USB	FIREWIRE
<ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ DriverCorruptMissing.html ◦ CMOSDisabled.html ◦ PowerDataCables.html ◦ IRQConflict.html • CantReadData <ul style="list-style-type: none"> ◦ NoMedia.html ◦ MediaDefect.html ◦ Virus.html ◦ PowerDataCables.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ Defragment.html ◦ PowerDataCables.html 	<ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ DriverCorruptMissing.html ◦ CMOSDisabled.html ◦ PowerDataCables.html ◦ IRQConflict.html • CantReadData <ul style="list-style-type: none"> ◦ NoMedia.html ◦ MediaDefect.html ◦ Virus.html ◦ PowerDataCables.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ Defragment.html ◦ PowerDataCables.html 	<ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ DriverCorruptMissing.html ◦ CMOSDisabled.html ◦ PowerDataCables.html ◦ IRQConflict.html • CantReadData <ul style="list-style-type: none"> ◦ NoMedia.html ◦ MediaDefect.html ◦ Virus.html ◦ PowerDataCables.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ Defragment.html ◦ PowerDataCables.html 	<ul style="list-style-type: none"> • Not Recognized <ul style="list-style-type: none"> ◦ DriverCorruptMissing.html ◦ CMOSDisabled.html ◦ PowerDataCables.html ◦ IRQConflict.html • CantReadData <ul style="list-style-type: none"> ◦ NoMedia.html ◦ MediaDefect.html ◦ Virus.html ◦ PowerDataCables.html • CantWriteData <ul style="list-style-type: none"> ◦ DiskFull.html ◦ Defragment.html ◦ PowerDataCables.html

Fig. 14B

. Tape Drive

IDE

- Not Recognized
 - CMOSDisabled.html
 - PowerDataCables.html
- CantReadData
 - NoTape.html
 - MediaDefect.html
 - PowerDataCables.html
- CantWriteData
 - WriteProtect.html
 - TapeFull.html
 - MediaDefect.html

ESDI

- Not Recognized
 - CMOSDisabled.html
 - PowerDataCables.html
- CantReadData
 - NoTape.html
 - MediaDefect.html
 - PowerDataCables.html
- CantWriteData
 - WriteProtect.html
 - TapeFull.html
 - MediaDefect.html

Manufacturer

- Not Recognized
 - CMOSDisabled.html
 - PowerDataCables.html
- CantReadData
 - NoTape.html
 - MediaDefect.html
 - PowerDataCables.html
- CantWriteData
 - WriteProtect.html
 - TapeFull.html
 - MediaDefect.html

Other

- Not Recognized
 - CMOSDisabled.html
 - PowerDataCables.html
- CantReadData
 - NoTape.html
 - MediaDefect.html
 - PowerDataCables.html
- CantWriteData
 - WriteProtect.html
 - TapeFull.html
 - MediaDefect.html

. Memory

- Total Memory Changes
 - bluescreen.html
 - simmdimm.html
- Illegal Operation Error
 - bluescreen.html
 - simmdimm.html
- Bad Memory Simm/Dimm module
 - bluescreen.html
 - simmdimm.html

. Mouse or Pointer

- Jumps around on screen
 - Maintenance
- Not Recognized
 - CMOS.html
 - cableconnection.html
 - irqsettings.html

. Processor

Fig 14c

- Slow Operations
 - [defragment.html](#)
 - [CMOS.html](#)
 - [CPUSeatinSocket.html](#)
 - [CPUCooling.html](#)
 - [JumperSettings.html](#)
 - [ReplaceCPU.html](#)
- System Locks up
 - [CPUSeatinSocket.html](#)
 - [CPUCooling.html](#)

. Video/Display

- Loses Picture
 - [AlternateVideo.html](#)
 - [IRQConflict.html](#)
 - [SlotConflict.html](#)
- Bad Picture
 - [IncorrectDriver.html](#)
 - [LooseCable.html](#)
 - [videoslot.html](#)
 - [BentPinCableOrCard.html](#)
 - [NoProgramSupport.html](#)
 - [CardDefective.html](#)
- Resolution Problems
 - [IncorrectDriver.html](#)
 - [Settings.html](#)
 - [BentPinCableOrCard.html](#)
 - [NoProgramSupport.html](#)

. Sound

- No Sound
 - [SpeakersTurnedOn.html](#)
 - [DriverCorruptMissing.html](#)
 - [CMOSDisabled.html](#)
 - [DriverDisabled.html](#)
 - [CablesDisconnected.html](#)
 - [BoardNotSeated.html](#)
- Sound Distorted
 - [SpeakersNotPluggedIn.html](#)
 - [BlownAmp.html](#)
 - [ProgramConflict.html](#)
- Missing Channel
 - [Balance.html](#)
 - [CablePlug.html](#)

Fig. 14D

- Audio Level Low
 - [VolumeControls.html](#)
 - [VolumeControlsConflict.html](#)

Printer

- PARALLEL (LPT)
 - Not Recognized
 - [DriverCorruptMissing.html](#)
 - [NotSetInBIOS.html](#)
 - [DriverDisabled.html](#)
 - [BentPinCable.html](#)
- SERIAL
 - Not Recognized
 - [DriverCorruptMissing.html](#)
 - [NotSetInBIOS.html](#)
 - [DriverDisabled.html](#)
 - [BentPinCable.html](#)
- FIREWIRE
 - Not Recognized
 - [DriverCorruptMissing.html](#)
 - [NotSetInBIOS.html](#)
 - [DriverDisabled.html](#)
 - [BentPinCable.html](#)
- USB
 - Not Recognized
 - [DriverCorruptMissing.html](#)
 - [NotSetInBIOS.html](#)
 - [DriverDisabled.html](#)
 - [BentPinCable.html](#)
- Not Printing
 - Not Printing
 - [NotSetInBIOS.html](#)
 - [DriverDisabled.html](#)
 - [SettingsIncorrect.html](#)
 - [BentPinCable.html](#)
 - [BoardNotSeated.html](#)
- Print Distorted, Smeared or invisible
 - Not Printing
 - [NotSetInBIOS.html](#)
 - [DriverDisabled.html](#)
 - [SettingsIncorrect.html](#)
 - [BentPinCable.html](#)
 - [BoardNotSeated.html](#)
 - Print Distorted, Smeared or invisible
 - [EmptyOrLowInk.html](#)
 - [IncorrectDriver.html](#)
 - [PrintHeadProblems.html](#)
 - [PaperProblems.html](#)
 - [BentPinCable.html](#)

PCMCIA

- Not recognized after hot insert
 - [BentPins.html](#)
 - [InstalledUpsidedown.html](#)
 - [ObstructioninCard.html](#)
 - [CardPropertiesnotListed.html](#)
 - [BadDevice.html](#)
- Card does not insert
 - [BentPins.html](#)
 - [InstalledUpsidedown.html](#)
 - [ObstructioninCard.html](#)
 - [DebreedinSocket.html](#)

Fig 14E

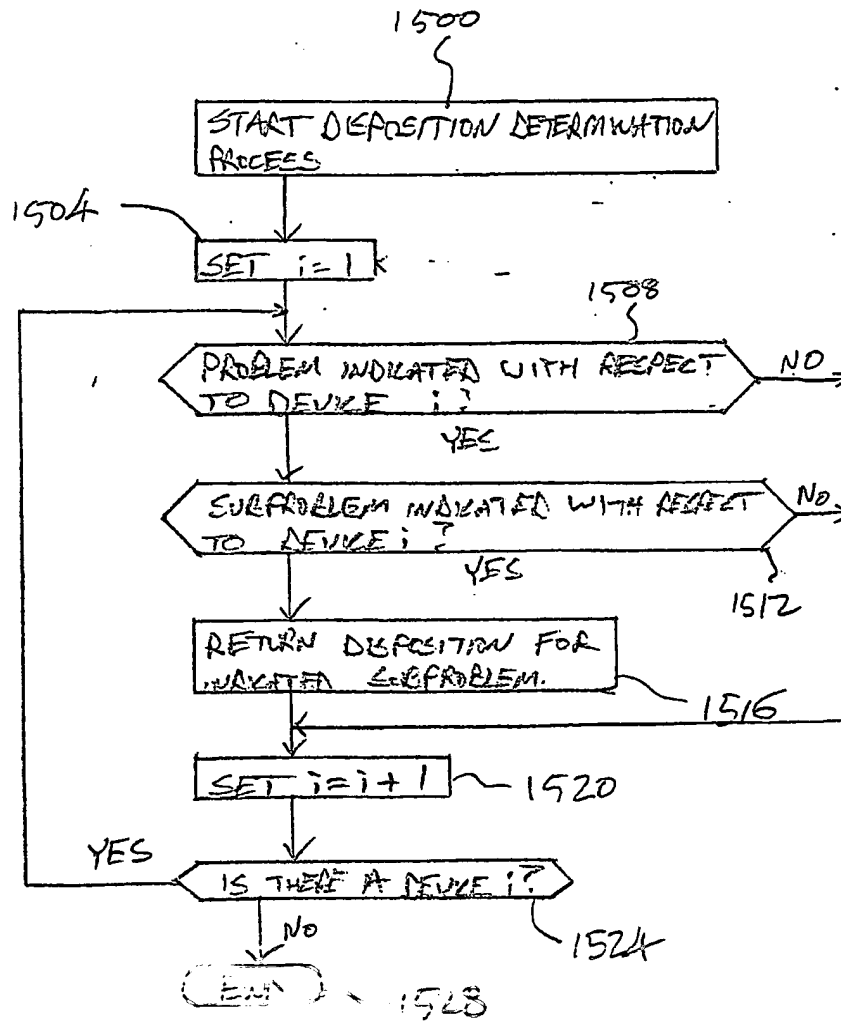


Fig. 15

Questions?

Glossary for terminology. Try it! It helps.

Basic steps to remember:

Next button will advance you to the next step.

Green text is for user action

Red text are warnings



pc pinpoint.com

Web-Based, Computer Diagnosis and Repair.

Supported by 24x7 Live Tech Help

Tired of spending endless time on hold waiting for tech support?
Want to avoid the hassle of hauling your PC to the repair shop?
Then welcome to the *new* tech support.

Three easy to use steps that are guaranteed to solve your computer hardware and software problems.

- Automated fixes, Self-Help Tutorials and Live 24x7 Tech Support -

It's here.

The first web-based computer diagnosis and repair service guaranteed to solve your PC problems on Windows® based computers - any time, anywhere.

It automatically tests your hardware and software, then tells you if something is wrong with your computer.

It walks you through a diagnosis process with automated fixes, guided self-help tutorials that teach you how to fix the problem yourself, or live tech support.

It tells you how much it should cost to replace your hardware if you need to.

No more waiting for someone to help you solve your PC problems.

No problems, no worries, no expensive repair bills.

It's only \$14.95 for single use, \$49.95 for a full year of security.

It's fast, effective and simple - just click the button at right to get started...

and relax.



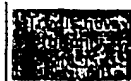
Click here for easy step by step instructions to fix your computer



a leading provider of internet and technology products for PC users

1600

Fig. 16




Questions?



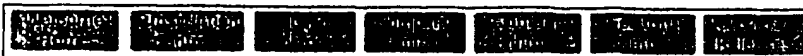
Glossary for terminology.
Try it! It helps.

Basic steps to remember:

Next button
 will advance you to the next step.

Green text is for user action

Red text are warnings



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Terms & Conditions

(Please read prior to utilizing service)

Disclaimer Notification.

PC Pinpoint.com is a service which involves customer interaction to solve problems. Action taken by customers utilizing this service cannot be controlled and, therefore, are undertaken at the sole risk of the user. PC Peripherals, Inc. and its subsidiary, DMO, Inc. dba Distinctive Technologies, make no warranties, either expressed or implied, with respect to the use of this service and will in no event be liable for any indirect or consequential damages of any nature suffered by any customer, client or third party due to the use of this service.

Security Notification.

PC Pinpoint is only a test service and does not save, store or view personal file data. All entries into our database are protected with 128 bit encryption, and anonymous unique ID's with no personal reference. We will not willfully or knowingly disclose or make available your name, address, telephone number, or email address to any third party. Please use at your own risk, although every effort has been made to ensure that you have a safe, and satisfying experience.

1704



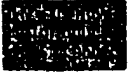
Click here to
Next
test
your computer


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
1700

Fig. 17


Questions?



Glossary for terminology. Try it! It helps.

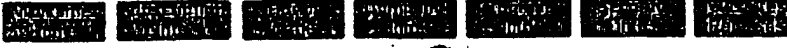
Basic steps to remember:

Next button
 will advance you to the next step.

Green text is for user action

Red text are warnings




Web-Based, Computer Diagnosis and Repair.
Supported by 24x7 Live Tech Help

Start Install of Diagnosis Program

Approximate File Download Size: 1.7MB

Estimated Install Times:

(varies due to connect speeds and internet traffic)

14.4kbps Modem: 20 min

56kbps Modem: 5 min

28.8kbps Modem: 10 min


128kbps DSL: 3 min

Step 1

Check the requirements. Is your computer running the following?

- **Windows 95, 98, 2000 or ME**
- **Approximately 2.5MB of free Hard Disk space**
- **16MB System RAM minimum**

If yes, proceed.

 Security and encryption is now engaged for your protection
After PC Pinpoint is installed, it can easily be removed using the Add/Remove Programs utility in the Control Panel. [Click here](#) for instructions.

Please Note:

PC Pinpoint will download a small communications program to your computer. If the program encounters problems when installing, disable your virus protection and try re-installing. If the problem persists, [click here](#) for an alternate download method.

 [Click here to Install](#)



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Fig. 18



UserID: 1000003481

Problem: You are not yet a PC Pinpoint Subscriber

Click here to purchase your PC Pinpoint subscription then
Click on the Next button below when your subscription is approved.



- or -

Enter Login:

Password:

Click Here To Login:

Questions? Login to Live Help Chat

Fig. 19



Purchase PC PinPoint Subscription

2004
Choose Subscription: * ☒ One Time Only (\$14.95)

2008 ☐ One Year Subscription (\$49.95)

Credit Card Type: * ☐ VISA

☐ Discover

☐ Master Card

☐ American Express

Credit Card Number: *

Expires (mmyy): *

Name of Cardholder: *

First Name: *

Middle Initial: *

Last Name: *

Address: *

City: *

State (US Only):

Select State

Postal Code: *

Country: *

USA

Phone Number of Cardholder: *

Email (for Automatic Customer Receipt): *

* Required entry

2000a

Fig. 204

How did you hear
of PC Pinpoint?

- ☐ Newspaper ☐ Radio
☐ TV ☐ Magazine
☐ Internet ☐ Other:

2020

Click on the
Submit
button only once

Submit

2024
The approval process can
take 10-30 seconds

PCPinpoint.com



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products for PC users



2000b

Fig: 20B

ENTER LOG IN NAME:

ENTER PASSWORD:

2100


Fig. 21

Tell a Friend

Click for Instant Support


Glossary for terminology. Try it! It helps.

Basic steps to remember.

Next button
 will advance you to the next step.

Green text is for user action

Red text are warnings




Entering Functional Test Sequence

Your computer will now undergo functional testing of all your hardware and system configuration settings.

WE HAVE DESIGNED SAFEGUARDS TO PROTECT YOUR SYSTEM DURING TESTING PROCEDURES

REQUIRED USER ACTION

To Perform Testing of Devices you **MUST** Insert one good, and readable disk / media for each *Floppy Drive, CD Rom/DVD, ZIP or Tape Drive.*



Insert Floppy



Insert CD and or DVD. When loading hold down the Shift Key on your Keyboard. The whirling sound will stop. This stops the auto-load feature.

If the CD/DVD you have inserted has an auto load feature you may begin to load an installation program. This action will bring up a different screen. If this happens. You **MUST** Click On **CANCEL** to **ABORT** the installation operation or you may change important settings in your application.



Insert ZIP



Insert cartridge, data tape, or other peripheral

Click Next




220A
 This will take you to the Next Test Sequence page

2200

Fig. 22


Tell a Friend

Basic steps to remember:

Next button
 will advance you to the next session.

Green text is for user action

Red text are warnings



 **pc pinpoint.com**

Please wait, Test will take a few minutes.
 Do not use your keyboard or mouse until testing is complete!

Your Computer is being tested now, Do not stop procedure until test is over



Security and encryption is now engaged for your protection



Test:

During the next few minutes your computer should make several bell sounds and the screen may blink.
 Do not worry this is only for test purposes.
 Please Note: After PC Pinpoint is installed, it can easily be removed using the Add/Remove Programs utility in the Control Panel.



2300


Fig. 23

Tell a Friend

Click for Instant Support


Glossary for terminology. Try it! It helps.

Basic steps to remember:

Next button  will advance you to the next session.

Green text is for user action

Red text are warnings



SYSTEM STATUS for PC Pinpoint User: [1000003481]

pc pinpoint

System Information Report

PC Pinpoint has detected the following hardware and software inventory on your computer. Please print the following information for your records.



SYSTEM INFORMATION

CPU Type: Pentium(R) III
 CPU Speed: 600 MHz
 Windows Version: Windows 98
 BIOS Vendor: Phoenix Technologies Ltd.
 BIOS Version: HY.01.03US
 BIOS Date: 03/09/2000
 Windows System Directory:
 C:\WINDOWS\SYSTEM\
 Free drive space on C: drive: 13 GIG(s)
 Total RAM: 131 MB

HARDWARE

SOUND CARD

Description: Crystal SoundFusion(tm) PCI Audio Accelerator
 Manufacturer: Crystal Semiconductor Corporation
 Model: Crystal SoundFusion(tm) PCI Audio Accelerator
 Problem Code: 0
 Test Results: PASSED

CD-ROM/DVD

Drive Letter: D:
 Description: LITEON CD-ROM LTN485S
 Manufacturer: LITEON
 Model: LITEON CD-ROM LTN485S
 Problem Code: 0
 Test Results: FAILED

PRINTER

NOTE: Printer must be turned on to be Detected
 Description: HP C LaserJet 4500-PS
 Manufacturer: HP
 Name: HP C LaserJet 4500-PS
 Problem Code: 0
 Test Results: PASSED

Description: HP LaserJet 4000 Series PCL 5e
 Manufacturer: HP
 Name: HP LaserJet 4000 Series PCL 5e
 Problem Code: 0
 Test Results: PASSED

Description: HP LaserJet 5Si PCL 5e
 Manufacturer: HP
 Name: HP LaserJet 5Si PCL 5e
 Problem Code: 0
 Test Results: PASSED

Description: HP LaserJet 5Si PCL 5e
 Manufacturer: HP
 Name: HP LaserJet 5Si PCL 5e
 Problem Code: 0
 Test Results: PASSED

FLOPPY/DISKETTE DRIVE

MONITOR

2400b

2420 →

Drive Letter: A:
Description: GENERIC NEC FLOPPY DISK
Manufacturer: NEC
Model: NEC FLOPPY DISK
Problem Code: 0
Test Results: FAILED

2424 ↓

Description: Plug and Play Monitor
Manufacturer: Plug and Play Monitor
Model: Plug and Play Monitor
Problem Code: 0

VIDEO ADAPTER

2428 →

Description: Matrox Millennium G250 AGP - English
Manufacturer: MATROX
Model: Matrox Millennium G250 AGP - English
Problem Code: 0
Test Results: PASSED

HARD/FIXED DISK

Drive Letter: C: ← *2432*
Drive Number: 0
Description: GENERIC IDE DISK TYPE01
Manufacturer: GENERIC
Model: IDE DISK TYPE01
Size: 15 GIG(s)
Problem Code: 0
Test Results: PASSED

POINTER

2436 →

Description: PS2 (PS/2)
Manufacturer: Logitech
Name: PS2 (PS/2)
Problem Code: 0
Test Results: PASSED

MODEM/NETWORK

2440 ↓

Description: Intel(R) PRO/100 Management Adapter
Manufacturer: Intel
Model: Intel(R) PRO/100 Management Adapter
Problem Code: 0
Test Results: PASSED

PORTS

2444 →

Description: Communications Port (COM1)
Manufacturer: (Standard port types)
Model: Communications Port (COM1)
Problem Code: 0
Test Results: PASSED

Description: Communications Port (COM2)
Manufacturer: (Standard port types)
Model: Communications Port (COM2)
Problem Code: 0
Test Results: PASSED

Description: ECP Printer Port (LPT1)
Manufacturer: (Standard port types)
Model: ECP Printer Port (LPT1)
Problem Code: 0
Test Results: PASSED

USB

Description: Intel 82801AA USB Universal Host Controller
Manufacturer: Intel
Model: Intel 82801AA USB Universal Host Controller
Problem Code: 0
Test Results: PASSED

2448 ←

Description: USB Root Hub
Manufacturer: (Standard USB Host Controller)
Model: USB Root Hub
Problem Code: 0
Test Results: PASSED

Software Inventory

Accessories

Fy 248

CLIENT32
CWUS233R
Equation
GroupWise
Internet Explorer
Office
patches
pmap-brad
Reader
Setup

Address

client32.321
DISK1
Extended Keyboard
HPMMKEYB
LANINTEL
Outlook Express
PCPCClient
Program
Register
SPD

CHAT

2452 ←

Copernic 2000
ECDC Engine
FV2883
IDAPI
NetMeeting
Palm
PhotoHse
programs
RNG
SYSTEM

TextArt
Web Publish

UDFREADR
Windows Media Player

UNINSTAL
WinZip



2456

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User ID: 1000003481

Expires: 10/24/2001 11:00:04
AM

Fg 24C

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terminology.
Try it! It helps.

Basic steps to
remember:

Next button
will
advance you
to the next
step.

Green text is
for user action

Red text are
warnings



User 100003481's Problem Selection Page

Please select a description that best describes your problem

By Problem Selection
(Select best description)



I have a hardware problem

2508

Please scroll down and view
all options before making your
choice.



I have a software problem

2512



My Computer runs slow

2516



My Computer locks up

2520



I cannot retrieve file or program

2524



I am not sure

2528

2504

2500


Fig 25

Tell a Friend

**Click for
Instant Support**

**Glossary for
terminology.
Try it! It helps.**

Basic steps to
remember.

Next button
 will
advance you
to the next
step.

Green text is
for user action

Red text are
warnings



User 100003481's Problem Selection Page

Please select a description that best describes your problem

Hardware selection
(Select device for this test)
[you may select another later]

CD/DVD Player
D:LITEON CD-ROM LTN485S



Click here if one of Your
CD/DVD Players are Not Shown

You have indicated that you may have a
hardware problem.

Select one or more of the devices at the left
which you think may have a problem.

NOTE: You Must select only one device at a time
After performing self-help on the first device
return and select another device

Printer
HP C LaserJet 4500-PS
HP LaserJet 4000 Series PCL



5e
HP LaserJet 5Si PCL 5e
HP LaserJet 5Si PCL 5e

Click here if one of Your
Printers are Not Shown

2612

Monitor/Video Adapter
Plug and Play Monitor



**Matrox Millennium G250 AGP -
English**

Click here if one of Your
Monitor/Video Adapters are
Not Shown

260A

Sound Card
Crystal SoundFusion(tm) PCI
Audio Accelerator



Click here if one of Your
Sound Cards are Not Shown

2600a

Floppy Disk Drive
A:NEC FLOPPY DISK



Click here if one of Your
Floppy Disk Drives are Not
Shown

Pointing Device (Mouse)
PS2 (PS/2)





Click here if one of Your
Pointing Device (Mouse)s are
Not Shown





Tape Drive
Click here if an installed
Tape Drive is Not shown

Fig 26A


 **ZIP or Removable Cartridge Drive**
[Click here if an installed ZIP or Removable Cartridge Drive Is Not shown](#)


 **Hard Drive**
C:\IDE DISK TYPE01 2608
[Click here if one of Your Hard Drives are Not Shown](#)


 **PCMCIA**
[Click here if an installed PCMCIA Is Not shown](#)

Fax/Modem and Network
1. Intel(R) PRO/100 Management Adapter
 [Click here if one of Your Fax/Modem and Networks are Not Shown](#)

Modem
[Click here if an installed Modem is Not shown](#)

USB Port
1. Intel 82801AA USB Universal Host Controller
2. USB Root Hub
 [Click here if one of Your USB Ports are Not Shown](#)

Port
Communications Port (COM1)
Communications Port (COM2)
 [Click here if one of Your Ports are Not Shown](#)
1. Click here if an installed SCSI is Not shown

CPU
Pentium(R) III
PhoenixBIOS 4.0 Release 6.0.7
 [Click here if one of Your CPUs are Not Shown](#)

 **Memory**
131Meg

 [Click Here To Return.](#)

Fg 26B

User ID: 1000003481

2600c


Fig. 26C

**Tell a
Friend**

**Click for
Instant
Support**

**Glossary for
terminology.**
**Try it! It
helps.**

Basic steps to
remember:

Next button
 will
advance you
to the next
step.

Green text is
for user
action

Red text are
warnings



PC Pinpoint TM is about to begin diagnosing your problem and creating both automated and self help solutions.

You will be instructed to follow steps to resolve your computer problem. Please re-test after each step and click the "Done" button when completed.

The solutions and repair steps are built dynamically. Therefore if PC Pinpoint does not see a problem, that step will not be displayed.

PCPinpoint Symptom Selection Step

Please select a symptom from the available selections below.

LOSES PICTURE

The picture on the monitor is lost or goes on and off.

BAD OR DISTORTED PICTURE

The picture on the monitor is distorted making shapes out of perspective or the picture is unclear and hard to read.


RESOLUTION OR COLOR PROBLEMS

1. Print looks smaller/larger. 2. Color or text is not crisp or has changed.

Click Here to go back and select another problem.


Fig.27


User ID: 1000003481


Tell a Friend Click for Instant Support Glossary for terminology. Try it! It helps. Basic steps to remember: Next button will advance you to the next step. Green text is for user action Red text are warnings	Test Results	Select Another Device / Problem	System Information Report	Potential Issues	Maintenance Utility	PC Service and Upgrade Station	Abort Current Session
	2852 STATUS for PC Pinpoint User: [1000003481] 						


Test Results
ALERT: 1 Problem Selected, -1 Additional Detected.


 Your test results indicate you need to perform self-help steps to resolve your problem. Read about button use below, then go down to 'Step: 1' to begin repair.

 Use the  button at each step to view the repair procedure.

 Use the  button if instructed to retest.

 Use the  button after you complete a repair step.




 Use the  button at any time you need help.



1st Problem
Status: VIDEO ADAPTER Matrox Millennium G250 AGP - English PASSED

 You have selected the VIDEO ADAPTER as a problem on the problem selection page. PCPinPoint has not detected a problem. Follow the steps below in sequence to PinPoint the problem or begin fixes.

2804 — **Step: 1 BAD OR DISTORTED PICTURE**
 Incorrect or default driver for the monitor may alter the picture. Click on "Show Me Fix" to be shown step by step fix procedure. Once step is completed click on "Done".

2805 —  First.....Click on this button to be shown the step-by-step fix procedure
 2800a 2810 —  Third.....Click on this Button when Finished with this step, then start on your next problem.
 **HELP**.....Click on this Button for 24hr live help.

2812 — **Step: 2 BAD OR DISTORTED PICTURE**
 Loose monitor cable can cause picture to be distorted or intermittent. Click on "Show Me Fix" to be shown step by step fix procedure. Once step is completed click on "Done".

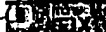




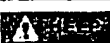









2816 —  First.....Click on this button to be shown the step-by-step fix procedure
 2818 —  Third.....Click on this Button when Finished with this step, then start on your next problem.
 **HELP**.....Click on this Button for 24hr live help.

Fig28A

- 2820 — **Step: 3 BAD OR DISTORTED PICTURE**
Video slot may have a conflict or be installed incorrectly Click on "Show Me Fix" to be shown step by step fix procedure. Once step is completed click on "Done".
- 2824 —  **First.....**Click on this button to be shown the step-by-step fix procedure
- 2826 —  **Third.....**Click on this Button when Finished with this step, then start on your next problem.
-  **HELP.....**Click on this Button for 24hr live help.
- 2828 — **Step: 4 BAD OR DISTORTED PICTURE**
Bent or pushed pin on cable or video card can cause picture problems. Click on "Show Me Fix" to be shown step by step fix procedure. Once step is completed click on "Done".
- 2832 —  **First.....**Click on this button to be shown the step-by-step fix procedure
- 2834 —  **Third.....**Click on this Button when Finished with this step, then start on your next problem.
-  **HELP.....**Click on this Button for 24hr live help.
- 2836 — **Step: 5 BAD OR DISTORTED PICTURE**
Driver may not support the program you are running or video card may not be new enough to run the application. Click on "Show Me Fix" to be shown step by step fix procedure. Once step is completed click on "Done".
- 2840 —  **First.....**Click on this button to be shown the step-by-step fix procedure
- 2842 —  **Third.....**Click on this Button when Finished with this step, then start on your next problem.
-  **HELP.....**Click on this Button for 24hr live help.
- 2844 — **Step: 6 BAD OR DISTORTED PICTURE**
Video card may be defective. Click on "Show Me Fix" to be shown step by step fix procedure. Once step is completed click on "Done".
- 2848 —  **First.....**Click on this button to be shown the step-by-step fix procedure
- 2850 —  **Third.....**Click on this Button when Finished with this step, then start on your next problem.
-  **HELP.....**Click on this Button for 24hr live help.

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28006


Fig 28B

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Basic steps to
remember:

Next button
 will
advance you
to the next
step.

Green text is
for user
action

Red text are
warnings



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NOTE: Please read and follow these instructions. Use the link at the end to
RETURN to the problem page and then complete this Step by selecting the **DONE**
button.

Video Card

**PC Pinpoint has determined that the
Incorrect Driver may be installed for your
video card**

**Most companies that produce video boards
supply drivers with the boards. Although the
cards may function to a limited degree with a
default set of drivers provided by windows it is
usually preferable to use the video drivers
supplied by the manufacturer either on disk,
CD/DVD or via their website.**

**If you have the disk or CD place it in the
correct drive and follow instructions for
installation. If you don't have the disk or CD,
follow the action step below to find it.**

ACTION:

**Click on the links below to be redirected to
manufacturer's website, or other driver
locations.**

**Find the section or search engine that will
allow you to locate the appropriate driver for
your device. Load new or updated Driver
[@sDriver]**

**Using the identified device part number, enter
part number into the search engine locator,
and press go. Once a driver is located
download the file, and install as per
instructions given with the downloaded file.**

**If downloaded file is a zip file, you may be
required to download a decompression utility.
One example of this is: WinZIP located at
<http://www.winzip.com>.**

**Use this utility to open, and or extract the
downloaded zip file.**

**Once the installation is complete, please
return to PCPinpoint by using the PCPinpoint
Icon located on your desktop.**

2900a

Fig. 29A



When completed, Click Here To Return.

User ID: 1000003481

29006

Fig. 29B

**Tell a
Friend**

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Support**

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helps.**

Basic steps to
remember:

Next button
will
advance you
to the next
step.

Green text is
for user
action

Red text are
warnings



pc pinpoint

NOTE: Please read and follow these instructions. Use the link at the end to RETURN the problem page and then complete this Step by selecting the **DONE** button.

Video Card

You have indicated that you have a bad picture on your monitor

Disconnected or defective cables, bent or pushed pins or loose cables can the picture to be **BAD** or distorted

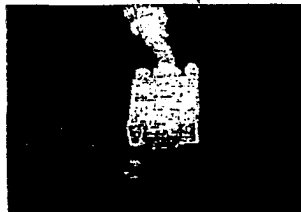
ACTION:

Verify that the cable is inserted properly into the video connector on the back of your computer. Make sure that the cable is tightened to the adapter with the attaching screws that are part of the cable. The connector can be located on the back of the computer as displayed.

3000a

3004b

3004a



VGA
Male/Female
Connectors

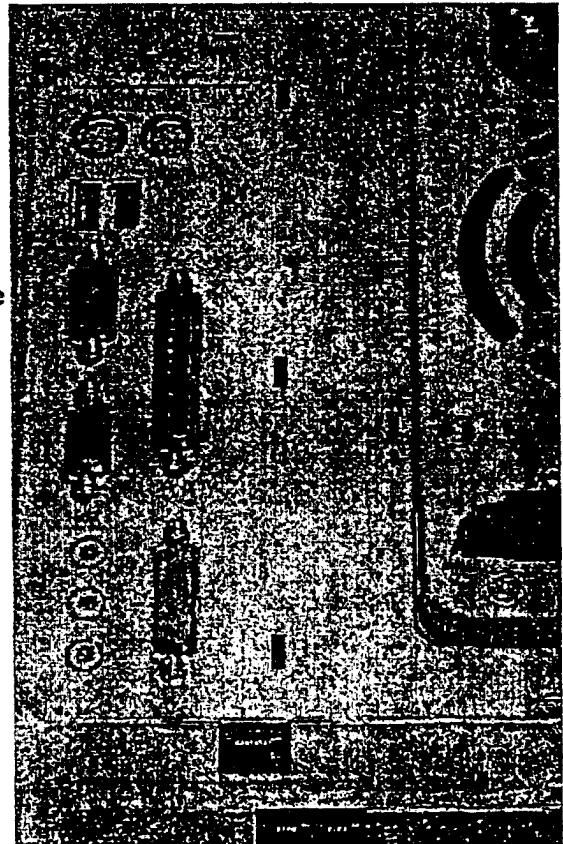


Fig 30A



When completed, Click Here To Return.

3008

User ID: 1000003481

3000b


Fig 30B

**Tell a
Friend**

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Instant
Support**

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helps.

Basic steps to
remember:

Next button
 will
advance you
to the next
step.

Green text is
for user
action

Red text are
warnings



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NOTE: Please read and follow these instructions. Use the link at the end to RETURN to the problem page and then complete this Step by selecting the DONE button.

Video Card

**You have indicated that you have a
poor picture on your monitor**

**At times a video card is not capable of
supporting the requirements of your
software.**

ACTION:

**You should either purchase and install a
new video card which meets or exceeds
the specifications of the software you
are running or discontinue use of the
software.**

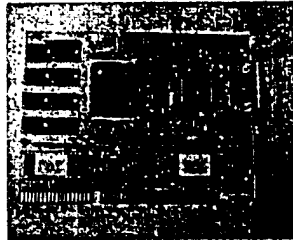
When completed, Click Here To Return.

L 3204

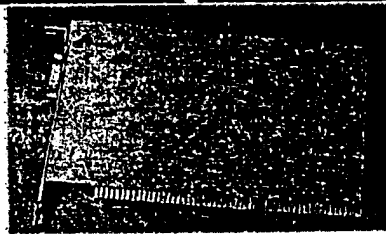
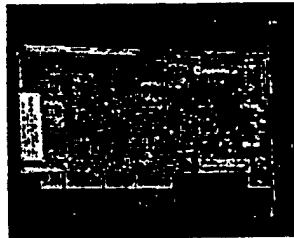
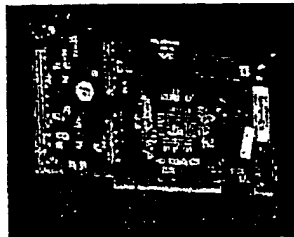
3200

Fig. 32

User ID: 1000003481



3104b



3100b

Fronts and backs of typical video cards PCI, AGP
and older ISA bus type cards



When completed, Click Here To Return.

3108

User ID: 1000003481

Fig. 31b

Tell a Friend

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Basic steps to remember:

Next button
[Next] will advance you to the next step.


Green text is for user action

Red text are warnings



Test Results	Select Another Device / Problem	System Information Report	Potential Issues	Maintenance Utility	PC Service and Upgrade Station	Abort Current Session
------------------------------	---	---	----------------------------------	-------------------------------------	--	---------------------------------------

STATUS for PC Pinpoint User: [1000003481]



Test Results
ALERT: 1 Problem Selected, -1 Additional Detected.

Your test results indicate you need to perform self-help steps to resolve your problem. Read about button use below, then go down to 'Step: 1' to begin repair.

Use the [Next] button at each step to view the repair procedure.

Use the [Cancel] button if instructed to retest.

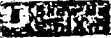
Use the [Done] button after you complete a repair step.


Use the [Help] button at any time you need help.


1st Problem
Status: C: IDE-HARD/FIXED DISK IDE DISK TYPE01 PASSED

You have selected the HARD/FIXED DISK as a problem on the problem selection page. PCPinPoint has not detected a problem. Follow the steps below in sequence to PinPoint the problem or begin fixes.


3408 — **Step: 1 CAN NOT WRITE TO DISK**
The hard disk cannot write if it is full. Click on "Show Me Fix" to be shown step by step fix procedure. Once step is completed click on "Done".


3412 —  First.....Click on this button to be shown the step-by-step fix procedure

3414 —  Third.....Click on this Button when Finished with this step, then start on your next problem.

 **HELP**.....Click on this Button for 24hr live help.

3400a — **Step: 2 CAN NOT WRITE TO DISK**
Your drive may need defragmented. Click on "Show Me Fix" to be shown step by step fix procedure. Once step is completed click on "Done".

3416 —  First.....Click on this button to be shown the step-by-step fix procedure

3420 —  Third.....Click on this Button when Finished with this step, then start on your next problem.


3422 —  **HELP**.....Click on this Button for 24hr live help.


Fig. 34A

**Tell a
Friend**

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Instant
Support**

**Glossary for
terminology.**
**Try it! It
helps.**

Basic steps to
remember:

Next button
 will
advance you
to the next
step.

Green text is
for user
action

Red text are
warnings



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PC Pinpoint TM is about to begin diagnosing your problem and creating both **automated** and **self help** solutions.

You will be instructed to follow steps to resolve your **computer** problem. Please re-test after each step and click the **"Done"** button when completed.

The solutions and repair steps are built dynamically. Therefore if PC Pinpoint does not see a problem, that step will not be displayed.

PCPinpoint Symptom Selection Step

Please select a symptom from the available selections below.

CAN NOT RETRIEVE PROGRAM OR DATA

When accessing data or program the hard drive cannot read.

3304

CAN NOT WRITE TO DISK

When saving data the hard drive is full or displays write errors.

3308

Click Here to go back and select another problem.

3300

Fig 33


User ID: 1000003481

Tell a Friend

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Glossary for terminology.
Try it! It helps.

Basic steps to remember:

Next button
 will advance you to the next step.

Green text is for user action

Red text are warnings



NOTE: Please read and follow these instructions. Use the link at the end to RETURN to the problem page and then complete this **Step** by selecting the **DONE** button.

HARD / FIXED DISK

You Cannot Write To Disk

Your Hard/Fixed disk appears full, or out of free space.

ACTION:

You can delete unnecessary files to free up additional space. Click on the link below to delete files.
Once files have been deleted please come back to www.pcpinpoint.com for further instruction.

[Delete Files] ————— 350.4

3500




 **When completed, Click Here To Return.**

3508

Fig. 35

User ID: 1000003481

{ID|1000003481|ID} {INX|E|INX} {XIT|Y|XIT} {URL|http://www.pcpinpoint.com/feedback/index.asp?UserID=100

- 3424 — **Step: 3 CAN NOT WRITE TO DISK**
 Saving data to the hard drive can cause errors if the drive cables are loose. Click on "Show Me Fix" to be shown step by step fix procedure. Once step is completed click on "Done".
- 3428 —  **First.....**Click on this button to be shown the step-by-step fix procedure
- 3430 —  **Thrd.....**Click on this Button when Finished with this step, then start on your next problem.
-  **HELP.....**Click on this Button for 24hr live help.

User ID: 1000003481

3400b


Fig. 34B

**Tell a
Friend**

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Support**

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helps.**

Basic steps to
remember:

Next button
 will
advance you
to the next
step.

Green text is
for user
action

Red text are
warnings



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NOTE: Please read and follow these instructions. Use the link at the end to RETURN to the problem page and then complete this Step by selecting the **DONE** button.

HARD / FIXED DISK

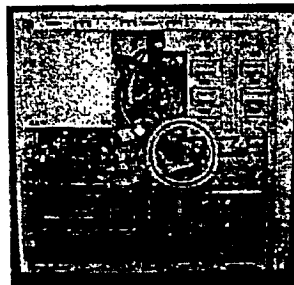
You Cannot Access your Hard / Fixed disk

The Hard Drive is connected to the computer in two ways. The 4 Pin Power connector to the power supply, and the data / ribbon cable to the controller or motherboard. If either of these cables are not connected properly you will not be able to access that drive.

ACTION:

Verify that your DATA cable does not have tears, breaks, nicks or damage to it, as well as assuring the wires are not exposed by the connector. If any wiring is exposed, it can be a cause of data loss, as well as lack of hard drive function. Open the computer, locate the Drive and check cables.

Side view of case with one of the possible locations for the hard drive



**(Click here for how
to open a
computer case)**

3700a

Power Cable



Data to Drive



These cables **MUST** be plugged in and seated properly for the Hard Drive to operate correctly. Check the connection by pressing the cables toward the drive. If you feel resistance, or cable is not seated straight, remove cable and verify that the pins are not bent inside the connector.


Fig. 37A

**Tell a
Friend**

**Click for
Instant
Support**

**Glossary for
terminology.**
**Try it! It
helps.**

Basic steps to
remember:

Next button
 will
advance you
to the next
step.

Green text is
for user
action

Red text are
warnings



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NOTE: Please read and follow these instructions. Use the link at the end to RETURN to the problem page and then complete this Step by selecting the **DONE** button.

HARD/FIXED DISK

You Cannot Write To Disk

Your Fixed/Hard disk could be out of free space.

ACTION:

You can defragment the disk to consolidate space. Click on the link below to defragment the disk..

Once the disk has been defragmented please come back to www.pcpinpoint.com for further instruction.

[Defragmentation]

3604

When completed, Click Here To Return.

3608

3600

Fig. 36

User ID: 1000003481

Tell a Friend

Click for Instant Support


Glossary for terminology.
Try it! It helps.

Basic steps to remember:

Next button
will advance you to the next step.

Green text is for user action

Red text are warnings




Test Results	Select Another Device / Problem	System Information Report	Potential Issues	Maintenance Utility	PC Service and Upgrade Station	Abort Current Session
------------------------------	---	---	----------------------------------	-------------------------------------	--	---------------------------------------


STATUS for PC Pinpoint User: [1000003481]


pcpinpoint.com


Test Results
ALERT: 1 Problem Selected, -1 Additional Detected.

Your test results indicate you need to perform self-help steps to resolve your problem. Read about button use below, then go down to 'Step: 1' to begin repair.

Use the  button at each step to view the repair procedure.

Use the  button if instructed to retest.

Use the  button after you complete a repair step.


Use the  button at any time you need help.


1st Problem
Status: PRINTER NOT DETECTED

You have selected the PRINTER as a problem on the problem selection page. PCPinPoint has detected a problem. Follow the steps below in sequence to PinPoint the problem or begin fixes.


3804 — **Step: 1 PRINTER NOT RECOGNIZED**
The printer is not printing. Click on "Show Me Fix" to be shown step by step fix procedure. Once step is completed click on "Done".

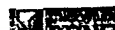
3805 —  First.....Click on this button to be shown the step-by-step fix procedure


3810 —  Third.....Click on this Button when Finished with this step, then start on your next problem.

 **HELP**.....Click on this Button for 24hr live help.

3812 — **Step: 2 PRINTER NOT RECOGNIZED**
Printer is not seen in printers folder. Click on "Show Me Fix" to be shown step by step fix procedure. Once step is completed click on "Done".

3816 —  First.....Click on this button to be shown the step-by-step fix procedure

 Third.....Click on this Button when Finished with this step, then start on your next problem.

3818 —  **HELP**.....Click on this Button for 24hr live help.

3800

Fig. 38



When completed, Click Here To Return.

L 3704

User ID: 1000003481

3700b

Fig-37B

AMIBIOS SETUP - FEATURES SETUP
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On-Board FDC	Enabled
On-Board Serial Port1	3F00/COM1
On-Board IR Port	Disabled
IR Duplex	Half
On-Board Parallel Port	370h
Parallel Port Mode	Normal
Parallel Port IRQ	7
Parallel Port DMA	0/6
On-Board PCN IDE	Both
Ultra DMA Support	Disabled
UDMA Function	Enabled
UDMA Function for DMA	Disabled

ESC : Quit F10 : Select Item
F1 : Help F11/F12 : Help
F5 : Load Values (Shift) F2 : Color
F6 : Load BIOS Defaults
F7 : Load Setup Defaults

3904

AMIBIOS SETUP - PERIPHERAL SETUP
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On-Board FDC	Enabled
Serial Port1	Auto
Serial Port2	Disabled
On-Board Parallel Port	Auto
Parallel Port Mode	Normal
Parallel Port DMA	0/6
Parallel Port IRQ	7

ESC : Quit F10 : Select Item
F1 : Help F11/F12 : Help
F5 : Load Values (Shift) F2 : Color
F6 : Load BIOS Defaults
F7 : Load Setup Defaults

3905

By using the arrow keys select/highlight the **Parallel Port Mode**. Ensure the **Parallel Port Mode** is set to Auto or enabled if your printer is connected to an your motherboard via an onboard Parallel port. If your printer is serial you will need to select the Serial port1 or Port2 and set to Auto

Fig 39B

**Tell a
Friend**

**Click for
Instant
Support**

**Glossary for
terminology.**
Try it! It
helps.

Basic steps to
remember:

Next button
will
advance you
to the next
step.

Green text is
for user
action

Red text are
warnings



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NOTE: Please read and follow these instructions. Use the link at the end to RETURN to the problem page and then complete this Step by selecting the DONE button.

Printer

PC Pinpoint has determined that your printer is not printing and may not be detected in the computer CMOS.

When your Printer Port not set in CMOS/BIOS it will not print

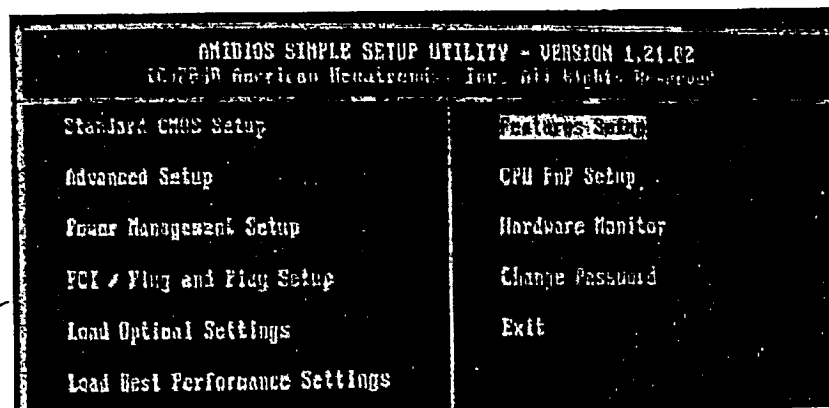
ACTION:

Your printer Port may not be set in the CMOS/BIOS. You will need to check the CMOS/BIOS Settings and activate the Printer Port if necessary. Follow the instructions below.

Enter the CMOS/BIOS Setup Utility at power on, and then add the Printer Port in the CMOS/BIOS settings.

Upon power up or reboot of the computer, you must enter the setup utility. The monitor will display a message similar to the following, indicating what key to press to enter the setup utility:
Press F1, F2, ESC, DEL or etc. to enter setup utility. If no key is displayed the monitor may display a "Splash" screen, with a manufactures logo, you should press TAB or ESC to bypass this screen.

Depress the key you are instructed to enter standard CMOS/BIOS setup page. The page looks similar to the following:



Select Features Setup from the CMOS/BIOS, depress enter and view screen that looks similar to one of the following:

Fig 39A

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warnings



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NOTE: Please read and follow these instructions. Use the link at the end to RETURN to the problem page and then complete this Step by selecting the **DONE** button.

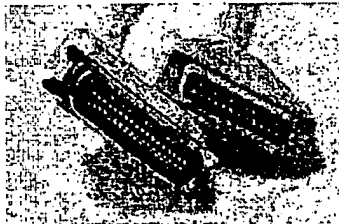
Printer

PC Pinpoint has determined that your printer is not recognized.

Your printer may not be recognized due to loose or disconnected cables, damaged cable, bent connector pins or the power is not on.

ACTION:

Verify that the printer cables are plugged in and printers power is connected and turned on. Find below the types of connectors your printer has and scroll down to the bottom of the page for further instruction.

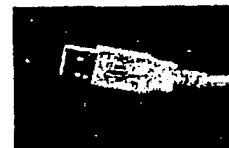


Connectors

Parallel



USB



4004

Please note that most
modern printers require
Bi-directional parallel
cables

Serial



Pictures of various Printer Connectors

USB Printer

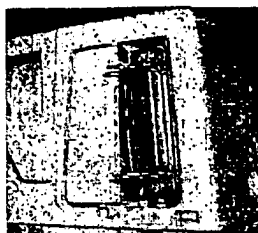
Fig. 40A

4000a

Parallel connector Parallel connector

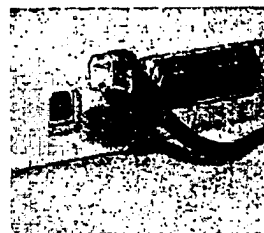


Attached Parallel connector

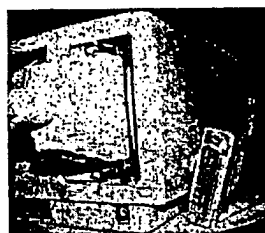


Attached Parallel connector

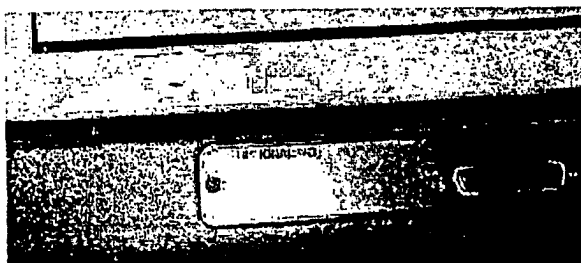
Connector



Attached USB Printer Connector



Laser Printer serial connector



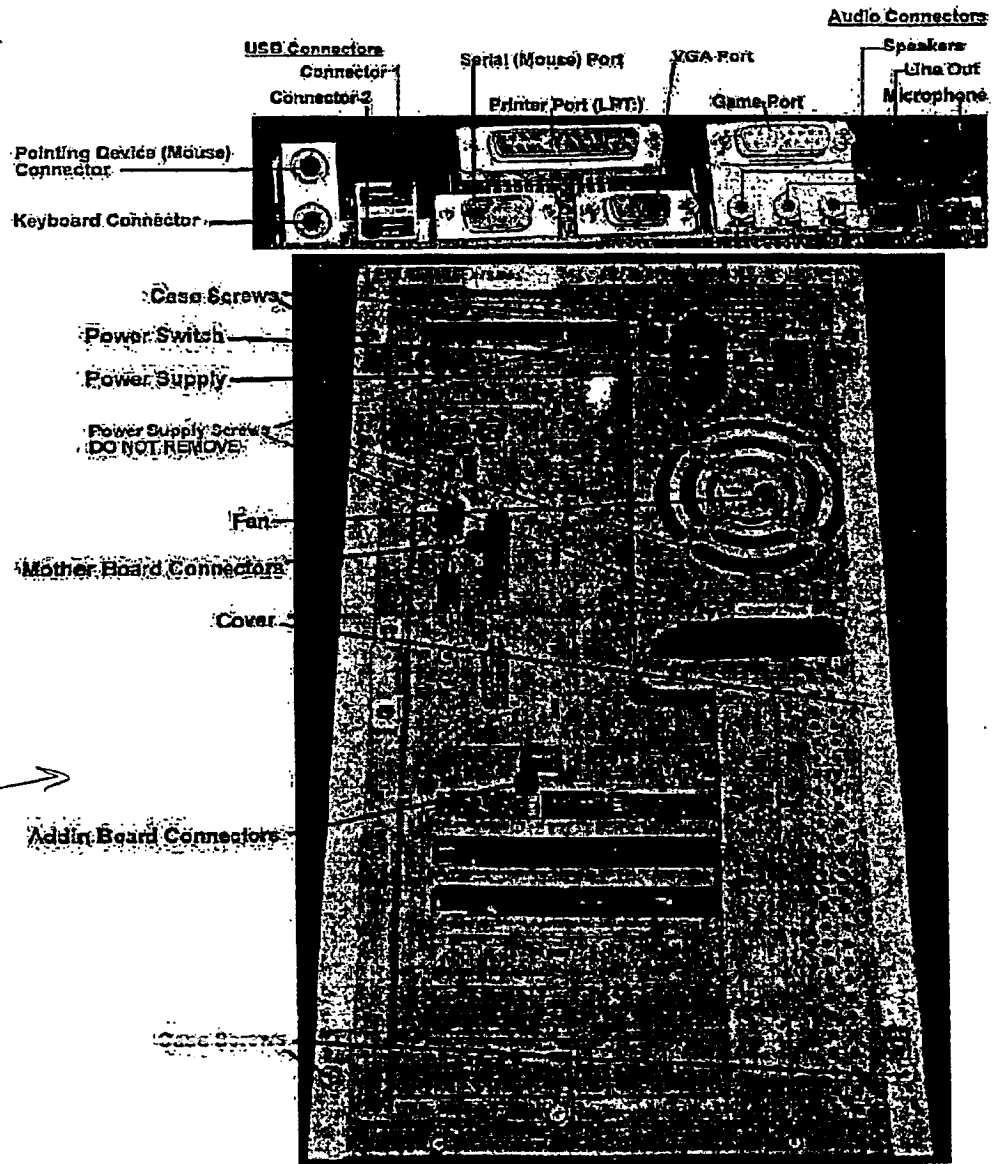
← 4004

Computer Rear View showing locations for connecting printer cables



4000b

Fig. 40B



Check connections for proper seating/connection of cables into printer and ports on computer.

These cables **MUST** be plugged in and seated properly for the Printer to operate correctly.

Check the connection by pressing the cables toward the connector. If you feel resistance, or cable is not seated straight, remove cable and verify that the pins are not bent inside the connector. Check cable for damage at or near the connectors or for torn or exposed wires.

Fig 40C



When completed, Click Here To Return.

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User ID: 1000003481

Expires: 10/31/2001 7:49:03
AM

4000d

Fig. 40D

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Basic steps to
remember:

Next button
(Next) will
advance you
to the next
step.

Green text is
for user action

Red text are
warnings



User 1000003481's Problem Selection Page

**Please select a description that best describes your
problem**

Software Selection
(Select symptom closest to your problem) If no problems [click here](#) to exit.

☒ **My program gives me an error message
before the program shows on my screen.**

You have selected software as a
potential problem.
Click on the description on the left
that best describes your problem.
Follow the steps to test and fix.

☐ **My program starts but when I try to use it
I get an error message.**

☐ **My program runs but it does not perform
correctly when used**

☐ **I get blue screens and error messages
when starting some programs**

☐ **My computer runs Slow during most
operations**

**[Click Here To
Return.](#)**

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User ID: 1000003481 Expires: 10/27/2001
3:50:37 PM


Fig. 41

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Basic steps to remember:

Next button
 will advance you to the next step.


Green text is for user action

Red text are warnings




Test Results	Select Another Device / Problem	System Information Report	Potential Issues	Maintenance Utility	PC Service and Upgrade Station	Abort Current Session
------------------------------	---	---	----------------------------------	-------------------------------------	--	---------------------------------------


STATUS for PC Pinpoint User: [1000003481]





Test Results
ALERT: 1 Problem Selected, 0 Additional Detected.


Your test results indicate you need to perform self-help steps to resolve your problem. Read about button use below, then go down to **'Step: 1'** to begin repair.

Use the  button at each step to view the repair procedure.

Use the  button if instructed to retest.


Use the  button after you complete a repair step.


Use the  button at any time you need help.

 Software Error

Software errors can come from many sources. Please follow the step below to locate the problem.

Step: RUN SCANDISK
Scandisk is a tool to repair corrupt files on your harddisk. Please select "Show Me Fix" to start this operation. Click on Done after you perform

4204  **First...** Click on this button to be shown the step-by-step fix procedure for Running Scan Disk.

4208  **Second...** Click on this Button when Finished with this step.

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User ID: 1000003481

Expires: 10/27/2001 3:50:37 PM

4200

Fig 42

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Basic steps to
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Next button
 will
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to the next
step.

Green text is
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Red text are
warnings



 **pc pinpoint.com**

DISK DRIVE CHECK

Description:

- All hard drives can develop bad spots, (damaged clusters or corrupt files from exiting windows early, etc). This utility will check for and repair some or all of these errors.

User Action:

- Click next, to start the hard drive check. Please be sure to run the program completely to maximize results.
- **NOTE:** Make sure that all programs such as virus protection and screen savers are turned off or the defragmentation will not complete.
**Note Some Clusters cannot be repaired.*

Display Activity.

- You will see a window pop open with an option to select one or more hard disk drives. Select one or all drives that you want to test, i.e. A:\, C:\ or D:\, etc.



This will take you to the next Test Sequence page

4304

4300

Fig. 43


User ID: 1000003481

Tell a Friend

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Glossary for terminology.
Try It! It helps.

Basic steps to remember:

Next button
 will advance you to the next step.


Green text is for user action

Red text are warnings




Test Results	Select Another Device / Problem	System Information Report	Potential Issues	Maintenance Utility	PC Service and Upgrade Station	Abort Current Session
------------------------------	---	---	----------------------------------	-------------------------------------	--	---------------------------------------


STATUS for PC Pinpoint User: [1000003481]





Test Results
ALERT: 1 Problem Selected, 0 Additional Detected.


Your test results indicate you need to perform self-help steps to resolve your problem. Read about button use below, then go down to 'Step: 1' to begin repair.

Use the  button at each step to view the repair procedure.

Use the  button if instructed to retest.


Use the  button after you complete a repair step.


Use the  button at any time you need help.

 Software Error

Software errors can come from many sources. Please follow the step below to locate the problem.

Step: RUN DEFRAG
Defrag is a tool to speed up your harddisk. Please select "Show Me Fix" to start this operation. Click on Done after you perform fix.

4404  First... Click on this button to be shown the step-by-step fix procedure for Running Defrag.

4408  Second... Click on this Button when Finished with this step

User ID: 1000003481

4400


Fig. 44

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Basic steps to
remember:

Next button
 will
advance you
to the next
step.

Green text is
for user action

Red text are
warnings




SPEED UP YOUR DRIVE

Description:

- The Hard Disk can become fragmented over time with parts of files spread all over the disk. This can slow the performance due to excessive accessing of the Hard Disk.

User Action:

- Click Next, to start the hard drive defragmentation. Please be sure to run the program completely to maximize results.
- **NOTE:** Make sure that all programs such as virus protection and screen savers are turned off or the defragmentation will not complete.

Display Activity.

- You will see a window pop open with an option to select one or more hard disk drives. Select one or all drives that you want to test, i.e. A:\, C:\ or D:\, etc.












This will take you to the next Test Sequence page

4504

4500

Fig. 45

User ID: 1000003481

<p>Tell a Friend</p> <p><u>Click for Instant Support</u></p> <p><u>Glossary for terminology.</u> Try it! It helps.</p> <p>Basic steps to remember:</p> <p>Next button  will advance you to the next step.</p> <p>Green text is for user action</p> <p>Red text are warnings</p> 	<p><u>Test Results</u></p>	<p><u>Select Another Device / Problem</u></p>	<p><u>System Information Report</u></p>	<p><u>Potential Issues</u></p>	<p><u>Maintenance Utility</u></p>	<p><u>PC Service and Upgrade Station</u></p>	<p><u>Abort Current Session</u></p>
	<p>STATUS for PC Pinpoint User: [1000003481]</p>						
	<p></p>						
	<p>Test Results ALERT: 1 Problem Selected, 0 Additional Detected.</p> <p>Your test results indicate you need to perform self-help steps to resolve your problem. Read about button use below, then go down to 'Step: 1' to begin repair.</p> <p>Use the  button at each step to view the repair procedure.</p> <p>Use the  button if instructed to retest.</p> <p>Use the  button after you complete a repair step.</p> <p>Use the  button at any time you need help.</p>						
<p>Software Error</p> <p>Software errors can come from many sources. Please follow the step below to locate the problem.</p> <p>Step: (IMPORTANT STEP - PLEASE READ ALL) CHECK FOR ERROR MESSAGE This step, will when you click the "Show Me Fix" button, minimize this PCPinPoint Client program and then display instructions for you to follow. It will ask you to start your application that is having problems. Our PCPinPoint Client will try to read the error that pops up on your desktop.</p> <p>4604 —  First... Click on this button to be shown the step by step fix procedure for Checking Program Error.</p> <p> Second... Click on this Button when Finished with this step.</p>							

User ID: 1000003481

4600


Fig 46

Tell a Friend

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Basic steps to
remember:

Next button
 will
advance you
to the next
step.

Green text is
for user action

Red text are
warnings




CHECK PROGRAM ERROR

Description:

- pc pinpoint will monitor the software or application that is having problems and determine which file or DLL is corrupted. If the software or application is inpc pinpoint's database we will initiate automated repairs.

User Action:

- Click next, you will be directed to the windows desktop and instructed to "DOUBLE CLICK ON" and launch, the software's startup icon that is causing problems. Continue to operate the software until the error is encountered.


Display Activity:

- The pc pinpoint window will close taking you to your desktop. Read and follow instructions that "pop up" to determine the problem




This will take you to the next Test Sequence page

User ID: 1000003481

<p>Tell a Friend</p> <hr/> <p>Click for Instant Support</p> <hr/> <p>Glossary for terminology. Try it! It helps.</p> <hr/> <p>Basic steps to remember:</p> <p>Next button will advance you to the next step.</p> <hr/> <p>Green text is for user action</p> <hr/> <p>Red text are warnings</p> <hr/> 	<p>Test Results</p>	<p>Select Another Device / Problem</p>	<p>System Information Report</p>	<p>Potential Issues</p>	<p>Maintenance Utility</p>	<p>PC Service and Upgrade Station</p>	<p>Abort Current Session</p>
---	-------------------------------------	--	--	---	--	---	--

STATUS for PC Pinpoint User: [1000003481]



Test Results
ALERT: 1 Problem Selected, 0 Additional Detected.

Your test results indicate you need to perform self-help steps to resolve your problem. Read about button use below, then go down to 'Step: 1' to begin repair.

Use the button at each step to view the repair procedure.

Use the button if instructed to retest.

Use the button after you complete a repair step.

Use the button at any time you need help.

Software Error

Software errors can come from many sources. Please follow the step below to locate the problem.

Step: (IMPORTANT STEP - PLEASE READ ALL) ERROR MESSAGE FOUND

The error message is:



If you have the program CD/Diskette we recommend you uninstall the program and then reinstall. Please select the "Done" button for uninstall instructions.

Click on this Button when Finished with this step.


User ID: 1000003481

F. 48

4800


Tell a Friend <hr/> Click for Instant Support <hr/> Glossary for terminology. Try it! It helps. <hr/> Basic steps to remember: Next button  will advance you to the next step. <hr/> Green text is for user action <hr/> Red text are warnings <hr/> 	Test Results	Select Another Device / Problem	System Information Report	Potential Issues	Maintenance Utility	PC Service and Upgrade Station	Abort Current Session
---	------------------------------	---	---	----------------------------------	-------------------------------------	--	---------------------------------------


STATUS for PC Pinpoint User: [1000003481]

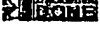


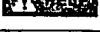
Test Results
ALERT: 1 Problem Selected, 0 Additional Detected.


Your test results indicate you need to perform self-help steps to resolve your problem. Read about button use below, then go down to 'Step: 1' to begin repair.

Use the  button at each step to view the repair procedure.

Use the  button if instructed to retest.

Use the  button after you complete a repair step.

Use the  button at any time you need help.

 **Software Error**


Software errors can come from many sources. Please follow the step below to locate the problem.


Step: (IMPORTANT STEP - PLEASE READ ALL) UNINSTALL PROGRAM

Please Read All Options (Choose Option)

1. If you have the program CD/Diskettes then we recommend that you uninstall the program and reload the software. Please click "Show Me Fix" button to uninstall the program.

2. If you do not have the program CD/Diskettes then you should NOT uninstall, as this will remove the program. Go to the manufacturers web site for software support.

4904  First... Click on this button to be shown the step-by-step fix procedure for uninstalling program.

4908  Second... Click on this Button when Finished with this step.

User ID: 1000003481

Fj 49



Problem Status Page

Problem solved or self-help completed.

If your problem is fixed or you have completed the self help, please press next button to receive a complete session summary with diagnosis results and part replacement estimates.



Don't forget to check out the Maintenance, Potential Issues and PC Service links to check your PC's health and maintenance before exiting PC Pinpoint.



Problem Not Solved.

If your problem has not been solved to your satisfaction.

Please use any of the three methods below to contact live technical support 24 hours a day. Receive a walk through or personal assistance from one of our highly trained technicians.

**Problem Resolution
Guaranteed!**

5000a



Fig 50A

1. Web Based Chat:

'Chat' with a Live tech.

5004

2. Phone Support:

You can reach PCPinpoint at the following toll free
phone number:877 4 FIX MY PC
877-434-9697

5008

3. E-mail:

mailto:techsup@pcpinpoint.com

5012

5016



Click Next to Continue.


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User ID: 1000003481

Expires: 10/27/2001 3:50:37
PM5000b

Fig 50B

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warnings



Test Results	Select Another Device / Problem	System Information Report	Potential Issues	Maintenance Utility	PC Service and Upgrade Station	Abort Current Session
------------------------------	---	---	----------------------------------	-------------------------------------	--	---------------------------------------

SYSTEM STATUS For PC Pinpoint User: [1000003481]



Official Diagnosis Report
Date: Nov 1 2001 1:36PM

Summary Report

Please print for your records.

Present this report to your computer repair company to pinpoint repairs & reduce costs

Click here to close this ticket.

(Close ticket when you are done using the service)



SOFTWARE ERROR

- Automated Test:
No automated fixes applied.

Selected Symptom: SOFTWARE ERROR

- History: Oct 31 2001 - Step: Scandisk
- History: Oct 31 2001 - Step: Defragmentation
- History: Oct 31 2001 - Step: Check for program error



CD-ROM/DVD - LITEON CD-ROM LTN485S

- Automated Test: PASSED

Selected Symptom: CAN NOT WRITE TO RAW CD ROM DRIVE



MONITOR - Plug and Play Monitor

- Automated Test: PASSED



HARD/FIXED DISK - IDE DISK TYPE01

- Automated Test: PASSED

Selected Symptom: CAN NOT WRITE TO DISK



FLOPPY/DISKETTE DRIVE - NEC FLOPPY DISK

- Automated Test: PASSED



MODEM/NETWORK - Intel(R) PRO/100 Management Adapter

- Automated Test: PASSED



MEMORY - Windows 98

- Automated Test: PASSED



POINTER - PS2 (PS/2)

- Automated Test: PASSED

[Click for Mfg's Support](#)

[Click for Mfg's Support](#)
Tech support #
800-555-1212

[Click for Mfg's Support](#)

Fig 51A

**PORTS - Communications Port (COM1)**

- Automated Test: **PASSED**

**PORTS - Communications Port (COM2)**

- Automated Test: **PASSED**

**PORTS - ECP Printer Port (LPT1)**

- Automated Test: **PASSED**

**PRINTER - HP C LaserJet 4500-PS**

- Automated Test: **PASSED**

[Click for Mfg's Support](#)**PRINTER - HP LaserJet 4000 Series PCL 5e**

- Automated Test: **PASSED**

[Click for Mfg's Support](#)**PRINTER - HP LaserJet 5Si PCL 5e**

- Automated Test: **PASSED**

[Click for Mfg's Support](#)**PRINTER - HP LaserJet 5Si PCL 5e**

- Automated Test: **PASSED**

[Click for Mfg's Support](#)**CPU - Pentium III, Pentium III Xeon**

- Automated Test: **PASSED**

[Click for Mfg's Support](#)**SOUND CARD - Crystal SoundFusion(tm) PCI Audio Accelerator**

- Automated Test: **PASSED**

[Click for Mfg's Support](#)**USB - Intel 82801AA USB Universal Host Controller**

- Automated Test: **PASSED**

**USB - USB Root Hub**

- Automated Test: **PASSED**

**VIDEO ADAPTER - Matrox Millennium G250 AGP - English**

- Automated Test: **PASSED**

[Click for Mfg's Support](#)

Selected Symptom: BAD OR DISTORTED PICTURE

*** Keep your PC Running at top performance using the Potential Issues maintenance and Service links below ***

5120

[Potential Issues](#)[Maintenance](#)[PC Service and Parts](#)

5124

5128

[Click to View Potential Future Problems](#)[Click to Run Required PC Product Links and Maintenance Services](#)


Fig. 51B

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


<u>Test</u> <u>Results</u>	<u>Select</u> <u>Another</u> <u>Device /</u> <u>Problem</u>	<u>System</u> <u>Information</u> <u>Report</u>	<u>Potential</u> <u>Issues</u>	<u>Maintenance</u> <u>Utility</u>	<u>PC</u> <u>Service</u> <u>and</u> <u>Upgrade</u> <u>Station</u>	<u>Abort</u> <u>Current</u> <u>Session</u>
-------------------------------	--	--	-----------------------------------	--------------------------------------	---	--


POTENTIAL ISSUES




ISSUES




System Resources are GOOD




RAM is GOOD



BIOS is OK



CPU is OK



DISK SPACE: Hard disk space is OK

User ID: 1000003481

5200

Fig. 52

Tell a Friend

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warnings







Test Results	Select Another Device / Problem	System Information Report	Potential Issues	Maintenance Utility	PC Service and Upgrade Station	Abort Current Session
----------------------------------	---	---	--------------------------------------	---	--	---

MAINTENANCE ISSUES

i MAINTENANCE

It is recommended that you run the maintenance utilities below in sequence e.g. first, second, third, ect. every three months to keep your computer at top performance

Turn off virus protection, screen saver or any program that has disk I/O as it will cause maintenance utilities to restart.
[click for Virus tutorial](#)
[click for Screen saver tutorial](#)

	UNWANTED FILES: Will free up disk space.	Click Here
	DISK ERRORS: Can cause programs to have problems.	Click Here
	FRAGMENTATION: Will cause system to run slow.	Click Here
	VIRUS PROTECTION: Will cause system to act erratic.	Click Here

User ID: 1000003481

5300


Fig. 53

Tell a Friend

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terminology.
Try it! It helps.**

Basic steps to
remember:

Next button
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Red text are
warnings



Test Results	Select Another Device / Problem	System Information Report	Potential Issues	Maintenance Utility	PC Service and Upgrade Station	Abort Current Session
----------------------------------	---	---	--------------------------------------	---	--	---

pc.pinpoint.com

PC SERVICE AND UPGRADE OPTIONS

The Icons below are links to companies and products for computer protection, upgrade and tutorials. Distinctive Technologies provides these as and added service to our customers but does not endorse the companies or products. It is the consumer's responsibility to check companies and products before using.

Check for Virus	Computer Performance Products	View Security Products	Links to Update Software	Upgrade Your Computer	Computer Tutorials
Click Here	Click Here	Click Here	Click Here	Click Here	Click Here

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Fig. 54